

THE SOUTHERN PLANTER.

Devoted to Agriculture, Horticulture, and the Household Arts.

Agriculture is the nursing mother of the Arts.—
Xenophon.

Tillage and Pasturage are the two breasts of the
State.—*Sully.*

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For the Southern Planter.

J. B. LAWES AND JUSTUS VON LIEBIG.

Nearly twenty years ago, an English land owner, JOHN BENNETT LAWES, instituted on his home farm, at Rothamstead, in Hertfordshire, some experiments on the action of different chemical combinations when applied as manures to the various crops of English agriculture. In 1843, he secured the assistance of Dr. J. H. Gilbert, and commenced on a large scale a series of experiments on wheat, turnips, beans, peas, tares, clover, &c. Dr. Gilbert, assisted by other able chemists, devoting his entire time to the work.

A field of 14 acres, after having been impoverished as much as possible by the growth and removal of four crops without manure, was divided into upwards of thirty plots, and set apart for a series of experiments on wheat. Another field of eight acres, of similar soil, was prepared in the same way, divided into a number of plots and devoted to a series of experiments on turnips. Another field of similar soil was treated in the same way and devoted to experiments on beans, peas, tares, &c. The various plots have been kept distinct to the present time, and in the wheat field each plot has been sown to wheat every year. In the turnip field, turnips have been grown on each plot every year up to the present time. So of beans, peas and tares.

One plot in each field has been left without any manure since the commencement of the experiments. The other plots were dressed with some one or more of the organic and inorganic elements of plants. The produce from each plot was kept separate, and the weight of grain, straw, &c.; and in the case of turnips the weight of buds and leaves accurately ascertained. The increase of produce over and above that obtained from the continuously unmanured plot was ascribed to the particular manure used.

Some of the results of these experiments

have been given to the public at various times through the *Journal of the Royal Agricultural Society* of England, the *Agricultural Gazette*, and the *Journal of the English Association for the advancement of Science*, periodicals which are seldom seen by American farmers; and it is to be regretted that, with a single exception, none of Mr. Lawes' articles have ever been republished in this country.

When he associated himself with Mr. Lawes, Dr. Gilbert had but recently returned from Giessen, where he received the diploma of Doctor of Philosophy from Prof. Liebig, and it is not improbable that he entertained some of the views of this distinguished chemist in regard to the manurial requirements of plants. Be this as it may, it is evident that the manures used the first year on the wheat field were selected with reference to the "*mineral theory*." They were composed of the constituents of the *ashes* of the wheat plant. They were applied in various quantities and combinations, but *failed in every instance to increase the yield of wheat*. On the other hand, where ammonia was used, the crop was greatly increased; and this, in a word, has been the prominent result of the experiments on wheat every subsequent year throughout.

These results were thought to be inconsistent with the mineral theory. They were supposed to prove, that although a soil abounded with the mineral elements of plants in an available condition, the atmosphere, rain and dews could not supply ammonia sufficient for a maximum crop of wheat.

Prof. Liebig, on the point of editing a new edition of his "*Chemistry in its Application to Agriculture and Physiology*," has had occasion, as he tells us, to examine the agricultural journals, in order to acquaint himself with the results of practical experience, that have been published since the appearance of the last edition of his book, in 1845. The result of this examination has led to the simultaneous pub-

lication in Germany, England, and the United States of a pamphlet entitled "The Relations of Chemistry to Agriculture, and the Agricultural Experiments of Mr. J. B. Lawes." The object of the pamphlet we will allow Liebig to state in his own words:

"The experiments of Lawes, of Rothamstead, are distinguished above all others by their extent and duration; and since the conclusions that their author has deduced from them stand in contradiction to the principles which I have taught in the above work, I consider his so-called practical criticism of scientific views especially adapted to serve as an example to convince agriculturists how necessary it is to select a correct method of experimenting, when, thereby, an opinion or doctrine is to be confirmed or refuted."

"All the experiments of Lawes prove precisely the contrary of that which, in his opinion, they should prove. I consider them, indeed, as the firmest support of the theory which they were originally intended to combat, and the facts which he has ascertained, teach so many important doctrines in reference to the cultivation and manuring of the soil, that I hold them to be of very special value to the theory of agriculture."

Lawes' experiments are "the firmest support" of the "principles" taught by Liebig, and are of "very special value to the theory of agriculture," and calculated to teach "many important doctrines in reference to the cultivation and manuring of the soil." What, then, are the principles taught by Liebig, and what are the results of Lawes' experiments?

It is by no means easy to answer the first question. An eminent German philosopher has said that Liebig's writings "*swarm with contradictions*;" and Dr. Hugo Mohl characterises his style as one "which leaves the reader, on almost every important topic, in perfect uncertainty what it really is that Liebig means."

The principal point of difference between Lawes and Liebig is in regard to the so-called "mineral theory," which Mr. Lawes thought embodied in the following sentence in Liebig's "Chemistry in its Application to Agriculture and Physiology": "The crops on a field *diminish or increase in exact proportion* to the diminution or increase of the mineral substances conveyed to it in manure." Liebig says Mr. Lawes appears to be unacquainted with any other sentence in his book, "*and this sentence he has entirely misunderstood.*" Again he says, "It is impossible to believe that he (Mr. Lawes) had any knowledge of this theory or was acquainted with my doctrines, otherwise, how could he have declared my opinions to be inconsistent with his experimental results?" Again, "It is not difficult to refute the views of another, if we attribute to him false assertions which he has not made." Again, "That

the mineral theory of Liebig is a pure invention of Mr. Lawes' might be clear to every one." Again, "My remark * * cannot be considered incorrect *because* Mr. Lawes has misunderstood its sense."

Leaving out of the question the work on "Chemistry in its Application to Agriculture and Physiology," in which Liebig now declares he did not teach the "mineral manure theory," let us see what he has written elsewhere, and also what others, besides Mr. Lawes, have taken to be his meaning. In a letter to the *Revue Scientifique et Industrielle*, Liebig says:

"In a short time I intend publishing a work which, I trust, will be interesting in the present state of agriculture. You are aware of the great importance which theoretical persons attach to the presence of ammonia in manures; so much so, that in France their value is estimated by the quantity of azote or ammonia they contain. For myself, for the last three years I have partaken of the common opinion, and regard the azote as not only useful but also necessary; but my last experiment, as well as careful observation, have lately compelled me to alter my opinion."

If we can understand language, Liebig here plainly states, that he formerly thought ammonia "not only useful but necessary," but that experiments and observation have compelled him to alter his opinion. In other words, he is now compelled to think ammonia neither necessary nor *useful* as a manure.

"It has been demonstrated," he continues "that ammonia is a constituent part of the atmosphere, and that as such it is directly accessible and absorbable by all plants. If, then, the other conditions necessary to the growth of the plants be satisfied—if the soil be suitable—if it contains a sufficient quantity of alkalies, phosphates, and sulphates, nothing will be wanting; the plants will derive their ammonia from the atmosphere, as they do carbonic acid. We know well that they are endowed with the faculty of assimilating those two aliments; and I really cannot see why we should search for their presence in the manures we use."

In other words, if plants are supplied with their appropriate mineral food, they will obtain ammonia from the atmosphere, and we need not care to apply it in manure. The following sentence also indicates that Liebig considers ammonia unnecessary:

"The question of the necessity for ammonia in our manures resolves itself into the question of the necessity for animal manures, and upon the solution depends the entire future prospects of agriculture; for as soon as we can dispense with bulky farm-yard manure by the use of artificial preparations, the productive power of our fields is placed in our own hands."

In an article "On the Principles of Artificial Manuring," written at Geissen, in 1845, occur the following sentences:

"It results from this with certainty, that the mineral substances which are furnished by the soil,

and which are found again in the ashes of plants, *are their true food*; that they are the conditions of vegetable life."

"The fertilizing power of manure can be determined by weight, as its effect is in *direct ratio to its amount in the mineral elements of the food of plants.*"

This is certainly explicit. The following argument is to the same effect:

"If these elements (the ashes of plants) are present in sufficient quantity and in appropriate proportions, the soil contains the conditions which render the plant capable of absorbing carbonic acid and ammonia from the air, which is an inexhaustible storehouse for them, and renders their elements capable of being assimilated by their organism."

"If we do not restore to a meadow the elements withdrawn, its fertility decreases. But its fertility remains unimpaired, with a due supply of animal excrements, fluid and solid, and it not only remains the same, but may be increased by a supply of mineral substances alone, such as remain after the combustion of ligneous plants and other vegetables, namely, *ashes*. Ashes represent the *whole* nourishment which vegetables receive from the soil. By furnishing them in sufficient quantities to our meadows, we give to the plants growing on them the power of condensing and absorbing carbon and nitrogen by their surface."

"Must not, we ask, the effect of the solid and fluid excrements, *which are the ashes of plants and grains burned* [the italics are Liebig's] in the bodies of animals and of man, be dependent upon the same cause? Must not the fertility resulting from their application be, to a certain extent,* independent of the ammonia they contain? Would not the effect be precisely the same in promoting the fertility of cultivated plants, if we had evaporated the urine and dried and burned the solid excrements before adding them to the soil? Surely the cerealia and leguminous plants which we cultivate must derive their carbon and nitrogen from the same source whence the graminea and leguminous plants of the meadow obtain them. No doubt can be entertained of their capability to do so." *Letters on Chemistry, last London edition, page 514.*

"Nothing can be more certain than the fact that an exportation of nitrogenized products does not exhaust the fertility of a country; inasmuch as it is *not the soil*, but the atmosphere, which furnishes its vegetation with nitrogen. It follows, consequently, that we cannot increase the fertility of our fields by a supply of nitrogenized products, or by *salts of ammonia alone*;† but rather that their produce *increases or diminishes in a direct ratio with the supply of mineral elements capable of assimilation.* * * * If we supply along with the ammonia all the conditions necessary for its assimilation, it

ministers to the nourishment of the plants; but if this artificial supply of ammonia is not given, they can derive *all the required nitrogen* from the atmosphere."—*Ibid* 517.

These quotations require no comments. Mr. Lawes is severely censured for supposing that Liebig taught that theory which ascribes the effect and value of manures to the inorganic constituents of plants which they contain. Liebig thinks Mr. Lawes has read only one sentence of his book, and misunderstood that one. Let us see, therefore, what others have understood Liebig to mean.

Sullivan, in his *Manures of the Farm*, says: "The admixture of caustic lime with night soil has been objected to on the ground of the chemical decomposition which would thereby ensue, and the consequent evolution and waste of ammoniacal gas; but we have the high authority of Liebig for stating that the efficacy of human feces as manure does not depend on their ammonia or nitrogen. Hence, in depriving night soil of smell, we do not diminish its value as a fertilizer." In other words, driving off the ammonia of manure does not decrease its fertilizing value.

Dr. Wessenborn, writing from Weimar to the *London Farmers' Magazine*, vol. 15, 373, says:

"The great rule of Prof. Liebig's new system of manuring is the following: Let the fields not be manured with stable dung, nor with any sort of dung whatever that contains organic (vegetable or animal) substances along with its organic (mineral) principles. This mineral manure the farmer has to procure either by incinerating all the vegetable substances that he has reaped, and which he cannot profitably sell or consume on his farm, especially by burning the straw; or by applying to a chemist with a view of having both the soil to be manured and the ashes of plants to be cultivated duly analysed, and of getting prepared, conformably to the result of such analyses, an artificial manure (mineral manure—manure of ashes) containing the very mineral food that the plant wants, and that is not already contained in the ground. * * * The farmer saves (by the new system of manuring) almost the whole of the expenditure for transporting manure to the fields, as the weight of the mineral manure he wants is only 26 per cent. of that of the stable dung hitherto used."

In one of his lectures, Mr. Karkeek adverted "to the doctrine recently introduced by Prof. Liebig, which under estimated the influence of organic manures in the soil and attached the more importance to the inorganic constituents of plants, by keeping a supply of which in the soil, he is of opinion that the carbon and nitrogen which are necessary for the growth of plants *will be supplied through the atmosphere*. This is a theory altogether opposed to the experiments which he (Mr. Karkeek) had placed before them that day, and it was also opposed to Liebig's previous teaching"—*Fur. Mag.*, vol. xv. 26).

Prof. E. N. Horsford while with Prof. Lie-

*We are now quoting from the last edition of Liebig's Familiar Letters on Chemistry, published in 1851, subsequent to the publication of Mr. Lawes' results. This qualifying clause was not in the former editions, where the sentence reads "Should not the fertility resulting from their application be altogether independent of the ammonia they contain?"

†Here, again, this qualifying clause was not in the former editions, which read—"We cannot increase the fertility of our fields by a supply of nitrogenized manure, or by salt of ammonia." The change of the word *manure* to *products* is also significant.

big at Geissen, will be considered good authority in regard to the views of Liebig on this point. In a letter to Prof. Webster, dated Geissen, May 1, 1846, he says:

"You are aware that Boussingault has expressed the opinion, after a variety of experiments, that the value of manure is in near relation to its percentage of ammonia. Mulder has, you know, written much in support of the view that ulmic and humic acids, ulmates, humates, etc., in one form and another, minister largely to vegetation.

* * Liebig differs from them all. * * He takes the position that the sources of carbon and nitrogen are carbonic acid and ammonia in the air. * * *

"It is obvious (from analysis of soils and rain-water) that the ammonia spread on fields in the ordinary distribution of barn-yard products is of no moment. The quantity with usual falls of rain greatly exceeds, in the course of a season, any conceivable supply by human instrumentality. * * *

Careful and numerous analyses of rain water and snow by Boussingault, Lawes, Way, and others prove beyond cavil, that "with usual [or unusual] falls of rain" no such quantity of ammonia is conveyed to the soil, as is here stated. We think that Prof. Horsford will now admit that "ten tons of ordinary barn-yard manure contain more ammonia than is carried to an acre of land in twelve months by usual falls of rain." This fact greatly weakens the force of Prof. Horsford's argument; but one object in quoting his remarks is not to attempt to point out where they conflict with more recent investigations, but simply to show that Mr. Lawes is not the only person who understood Liebig to teach "the mineral manure theory."

"But if in the manure heap and the liquid accumulations of the barn-yard, transported to the fields the ammonia be not the chief ingredient, or an important one, to what are we to attribute the unquestioned value of stable products and night soil? Prof. Liebig has shown that if plants be manured with the ashes of plants of the same species, as the grasses of our western country are when burned over in the fall, they are supplied with their natural food. * * Let us consider what these ashes are, and what manure is. Herbivorous animals derive their nourishment from the vegetable kingdom exclusively, their food being grass, grain, roots, etc. These, with their organic and inorganic matters are eaten. A portion of them is assimilated, becoming bone, muscle, tendon, fat, etc. Another portion is voided in the form of excrementitious matter. In process of time, the bones and tissue follow the same course. What today forms the eye, with its sulphur, and its phosphorus, and carbon, etc., will have accomplished its office, and left the organism to mingle with the excrements or escape as carbonic acid and water from the lungs. At length all the inorganic matters will re-appear in the voided products. * * The animal organism has performed the office of a mill. Grain was supplied. Instead of appearing as flour and bran and the intermediate meal, it appears after intervals of greater or less length, in soluble inorganic salts in the liquid excrements, in soluble inorganic salts in the solid excrements,

and in carbonic acid and water. Now, after burning a plant, what remains? It contained when growing carbon, nitrogen, hydrogen, and oxygen, as organic bodies, and water. It contained also, in variable proportions, common salt, potash, soda, magnesia, lime, iron, phosphorus, sulphur, and silica. The first four were expelled in the combustion. The remaining ingredients, for the most part, remained unchanged. Had the plant gone into the body of an animal, and in the course of its evolutions through the organism lost its carbon, hydrogen, nitrogen, and oxygen, the remaining ingredients would have been the same as before. In one case the plant would have been burned in the organism; in the other, in a crucible. The ashes and the excrements are substantially the same. * * Night soil and guano are the ashes of animal and vegetable organism burned in animal bodies. They are the ashes of plants—the essential food of plants. Hence their value as manures."

We might multiply such quotations from our agricultural literature of the past decade *ad libitum*, but the above are sufficient to show that Lawes and Wolf are not alone in ascribing the "pure mineral theory to Liebig."

His pupils and followers, as well as those who differed with him, evidently understood Liebig as asserting that if the inorganic constituents or *ashes* of a given species of plants were supplied in sufficient quantity, and in proper condition, we should obtain a maximum yield; that the crops on a field increased or diminished as these mineral elements were supplied or withheld; that the mineral manure patented by Prof. Liebig, was an embodiment of his views; and that "sooner or later, they (farmers) must see that in this so-called 'mineral theory,' in its development and ultimate perfection, lie the whole future of agriculture."

Liebig, in his recent pamphlet, denies ever having entertained these views, and admits, very reluctantly, however, that Mr. Lawes' experiments prove them to be erroneous. He now says:

"I consider ammonia and its salts exceedingly useful, and indeed at present even, *perfectly indispensable* as a means of increasing the produce of our fields beyond a certain limit, without the use of stable manure."

Surely there is some difference between this sentence and the following one, which will be found in the first edition of Liebig's "Letters on Chemistry," but which has been altered in the subsequent edition, published since the appearance of Mr. Lawes' papers:

"It follows consequently, that we cannot increase the fertility of our fields by a supply of nitrogenized manure, or by salts of ammonia; but rather that their produce increases or diminishes, in a direct ratio with the supply of mineral elements capable of assimilation."

It is evident from these and other sentences

which might be cited, that Liebig has changed his views in regard to the value of ammonia as a manure; but it is still very difficult to determine "what it really is that Liebig means." Perhaps he may accuse us, as he has Mr. Lawes, of having read but one sentence in his book, so we beg leave to state beforehand that we have read it over carefully several times, and that we are still in doubt as to the real position of the learned author on the subject it is the special object of the work to elucidate. He has made some "agricultural experiments" on a ten acre field, and in summing up his conclusions from them, says: "My experiments, which occasioned me an outlay of 8,000 florins, (\$3,200,) or \$320 per acre, show indeed that to make a soil fertile, which is barren from want of active (soluble) ingredients, and not on account of unfavorable physical condition, requires an outlay greater than the purchase of the most fruitful soil; but in this I was in no way disappointed. What I wished to arrive at, was well worth the sacrifice. What I have arrived at is, [now, surely, he will state his conclusions on the value of mineral manure; but alas, no! what he has arrived at is only] *the firm conviction that the time must come when agriculture will be carried on as an art, according to scientific principles, and not according to mere recipes.*"

Liebig brings forward these experiments as practical evidence of the correctness of his opinions, and they are, therefore, worthy of attention. He says:

"In the years 1845-9, I instituted a series of experiments on the action of individual mineral manures. * * Former experiments which I had made in my garden, gave no results; *do and apply what I would, I was not able to perceive any effect from a single one of my mixtures.*"*

The cause of this is ascribed to the richness of the garden soil. This led to purchase a

*Prof. HORSFORD, in one of his letters from Geissen, (*Cultivator*, 1846, page 139,) alludes to these experiments as follows: "In the spring, (1844,) preceding my arrival in Geissen, the Professor planted some grape scions under the windows of the laboratory. He fed them, if I may use such an expression, upon the *ashes of the grape vine*, or upon the proper inorganic food of the grape, as shown by analysis of its ashes. The growth has been enormous, &c. I was shown pots of wheat, in different stages of their growth, that had been fed variously—some upon the inorganic matters they needed according to the analysis of their ashes—others had merely shared the tribute of the general soil. The results in numbers I don't yet know in appearance, no one could be at a loss to judge of what might be expected. * * The experiments of Prof. L., which I have alluded to, are full of interest not alone as sustaining the views he has expounded, [what views, if not those of the mineral theory?] but as also showing that the treasures in the shade of inorganic manures, heaped up in some quarters of the globe, may be made to equalize the fruits of labor in other regions."

ten acre field, "distinguished from all other land in the vicinity by its almost perfect incapacity to support the ordinary cultivated plants; I do not believe that in an entire year, so much grass and fodder grew upon it as would sustain a single sheep." This was, unquestionably, a poor soil; and the mind recalls instances of similar soils having been rendered fertile by the ordinary processes of agriculture. The farms of the late Judge Buel, and D. D. T. More, of Waterleit, N. Y.; and many in the county of Norfolk, England, were once blowing sands, but now are as remarkable for fertility as they once were for barrenness. This result has been attained principally through growing crops of clover and turnips, by plowing them in, or consuming them on the farm, and returning the manure, thus supplying organic matter and especially ammonia from the atmosphere. This, however, is simply a deduction from certain theoretical considerations, founded on Mr. Lawes' experiments, and we have frequently expressed the wish that experiments with ammonia salts, organic matter, and mineral substances, might be instituted on similar soils. By applying ammonia on one plot, organic matter on another, the various mineral manures on others, and a mixture of these in different quantities and proportions on others, and reserving one plot without any manure at all, we might obtain decisive information on this interesting subject. Let us see what kind of experiments the great Geissen Professor instituted.

No part of the field was left without any manure. A quantity of mineral manure was spread uniformly over the *whole field*, excepting a piece of vineyard of about 2000 vines, each of which received at the time of planting one quarter pound of the *same mineral manure*. "On separate divisions of the field were cultivated wheat, rye, barley, clover, potatoes, maize, beets, and Jerusalem artichokes." Would it not have been better, instead of having nine different crops and only one kind of mineral manure, to have had nine different manures, and only one crop? If the ashes of plants represent the manure best adapted for their growth, no one compound of mineral manures could be best suited to both wheat and clover, maize and beets.

"Some patches received saw-dust, one nothing but stable-manure, another a mixture of the mineral manure with an equal quantity of stable-dung. Beside this stable-dung, no other animal substance or ammoniacal manure was used on the whole field. One small plot had added to it several wagon loads of soil from a forest; another received the same, mixed with the mineral manure."

In other words, the *whole field* was dressed with the *same mineral manure*. Some plots had stable-dung, and some forest soil with and without an additional quantity of the *same mineral manure*. No purely ammoniacal matter was used. The poor impoverished soils of Maryland, Virginia, &c., have been made to yield an excellent crop by the application of a small quantity of ammoniacal guano.

Who knows whether such would not have been the case with "Liebig's Heights?" Certainly, in instituting scientific experiments, there could have been no harm in trying.

"The crops the first year," says Liebig, "turned out so moderate, so bad, in fact," that no details are given. The yield of turnips, clover and potatoes, did not suffice for keeping one cow. In every case, however, where organic manures containing ammonia were used, the crops "were heavier than elsewhere." The wheat manured with "stable dung and minerals was equal to any in the neighborhood." Why not have tried a plot with stable dung, without any minerals?

It must be evident to all that the first year's results of Liebig's experiments are strongly in favour of organic or ammoniacal manures. We are told that in the second, third, and fourth years the soil increased in productiveness, though no details at all are given. In 1849, Liebig's gardener "purchased the whole field, and the industrious man, who could not afford to buy manure, manages with profit the now well-conditioned little farm; assisted, during the summer months, by a little business, in selling refreshments, he is able to support himself and family, keeping two cows, and annually raising several head of cattle; and he has acquired enough to enable him to enlarge his buildings; and all this without ammonia or humus, and only by help of mineral manures."

This is certainly a very gratifying result. After expending on ten acres of land \$3,200 for mineral manures, &c., an industrious Dutchman, by the aid of a little business, in which probably his wife and children engaged, was enabled to support himself; and all this without the aid of ammonia! Was it ever heard before that a man could get a living from ten acres of land, in close proximity to a large city? But let us see whether this was accomplished without the aid of ammonia. The forest muck, saw-dust, and stable-manure used the first year, all contained ammonia, and the crops were *much the best where they were used*. Liebig says:

"Since the present owner came into possession,

the stable-manure and all the animal excrements produced on the premises, and especially the urine, have been collected with the greatest care, and of course have been incorporated with the soil."

In other words, great care has been used to save all the ammonia and incorporate it with the soil, and fair crops, after a period of eight years, have rewarded the care and skill of the cultivator. Who knows but this same result might have been attained in one year, by an application of ammonia? If the atmosphere is capable of supplying all the ammonia that plants require, why was it found necessary on this field, which had been so lavishly dressed with all the mineral elements of plants, to save all the dung and "*especially the urine*," and incorporate them with the soil! Surely, the gardener evidenced little faith in the teachings of his great master! If these experiments prove anything, it is the very reverse of what Liebig intended they should prove; and they are the only experiments brought forward to sustain his position.

After disparaging Mr. Lawes' experiments Liebig says:

"The single problem worthy of scientific agriculture at the present time, is to establish in place of a change of crops, a change or succession of manures, which shall enable the farmer to grow on his fields that crop, which, under the circumstances, will be most profitable. How simple a form would the labors of a farm assume, could he continuously cultivate the same plant on the same field."

This is certainly a good idea, though an old one; but how shall we ascertain what manures are best adapted for the same crops? Liebig himself took out a patent for "a preparation of compounds, based upon analysis of plants, which were estimated to provide a given species of plants with a nourishment it would need throughout a series of years." That these compounds utterly failed in Germany, England, and America, is notorious. The idea was a splendid deduction, but, unfortunately for the farmer, so far from revolutionizing agriculture, as was predicted, it proved what might have been foreseen, that deduction is not a safe guide in scientific agriculture. We shall probably incur Liebig's displeasure by referring to this unfortunate manure speculation. He has brought forward a number of sentences from his various works to show that he did not teach "the pure mineral theory;" but this patent mineral manure, which is a practical embodiment of the theory, is not so easily disposed of; hence the bitterness manifested on the subject.

Liebig's patent mineral manures have confessedly failed to solve "the single problem worthy of scientific agriculture." We cannot, by their use, "continuously cultivate the

same plant on the same field." Now, though Mr. Lawes does not think it desirable to cultivate the same crops on the same land; he has succeeded in doing so to an extent which one would suppose from the above sentence, should have secured the approbation of the great German chemist. There is now growing on *Broadback** the *twelfth annual wheat crop*, and the crop of last year, (1854,) was the largest yet harvested from it; one plot yielding 55 bushels of wheat per acre. So with the turnips on *Barnfield*; the *thirteenth annual crop* is now growing, and though the soil is rather too heavy to be well adapted for turnip culture, yet good crops are obtained, fully equal, as we know from our own observation, to those grown in the neighborhood, under the ordinary system of rotation. So in *Geescroft*, twelve crops of beans have been grown in twelve years, and removed from the soil, and yet as good crops are obtained as the farmers could desire. So of peas and tares. Clover is an exception; no matter how lavishly and variously it is manured, clover will not flourish continually on the same land. But with other crops, Mr. Lawes has "solved the single problem worthy of scientific agriculture." At the present price of wheat and ammonia, Mr. Lawes or any other intelligent agriculturist, can not only grow wheat continuously on the same land, but can also *grow it with a profit*. If his land, without manure, will produce 15 bushels of wheat per acre, he can make it produce 30 bushels by an application of from \$12 to \$15 worth of manure. If wheat sells for 80 cents to \$1 per bushel, such a system will not pay; if it is worth from \$2 to \$3 per bushel, nothing can be more profitable.

Liebig says:

"So to explain the action, and recommend the use of ammonia salts in the production of wheat, as Mr. Lawes has done, appears to be mockery of the present state of agriculture; for all the salts now manufactured in Europe, are not enough to supply the fields of the kingdom of Saxony with the quantities used by Mr. Lawes."

This appears to us a very lame argument. What if salts of ammonia are not now manufactured in sufficient quantities? If farmers can obtain what they want at present, shall they not use them? The ammonia salts used in agriculture or commerce, are made principally from the refuse liquor of the gas works; and in nearly every city in Europe the greater portion of this liquor runs to waste. In this country, we know of but one establishment

where ammonia salts are manufactured from gas liquor for agricultural purposes. Shall we condemn the use of ammonia salts, because they are not at present extensively manufactured, while we have the means of increasing their production to an almost unlimited extent?

But Mr. Lawes has not "recommended the use of ammonia salts in the production of wheat." Mr. Lawes tells us, indeed, that ammonia is specially needed for the production of wheat; but he has never advised farmers to use ammonia salts at their present price. He used them in his experiments because they enabled him, for a special object, to apply ammonia free from the organic and mineral matter united with it in barn-yard manure, guano, rape cake, &c. These experiments led him to the conviction that ammonia, in ordinary agriculture, is greatly needed on all our wheat soils, but he has never recommended farmers to imitate his example, and purchase expensive ammonia salts. He points to cheaper sources of it. What these sources are, we shall see further on.

Professor Liebig, in some parts of his late work, appears to labor under the impression that Mr. Lawes affirms that if ammonia be present in sufficient quantity in the soil, the wheat plant can grow *without minerals*. We cannot understand how any one could arrive at such a conclusion from Mr. Lawes' writings. Certainly he has never written any thing which favors such an idea; while he has repeatedly declared that the "growing plant must have within its reach a sufficiency of the mineral constituents of which it is to be built up." He also fully admits that the atmosphere and rain-water are capable of supplying plants with a considerable quantity of ammonia. On these two main points, Liebig and Lawes are agreed. In what, then, do they differ? It is obvious that they do differ very essentially, but in what exact particulars, it is hard to say, simply because it is impossible to determine what Liebig at present teaches. From the general tenor of his works, we conclude that he believes, or did believe among other things, that the manurial requirements of a plant are represented by its ashes. In other words, that the *proportion* in which potash, phosphoric acid, &c., exist in the ashes of a plant, is the best *proportion* for them to exist in the manure adapted for their growth. The ash of wheat contains 50 per cent. of phosphoric acid; that of turnips only 10 per cent.; therefore, a manure for wheat should contain five times as much phosphoric acid as a manure for turnips. That Liebig and his followers have taught this

* *Broadback* is the name of Mr. Lawes' experimental wheatfield. All the fields in England are named. *Barnfield*, *Geescroft*, *Hawfield*, are the names of the experimental turnip, bean, pea, tare, and clover fields.

doctrine, cannot be denied. Mr. Lawes' experiments prove this idea erroneous.

Liebig, we have shown, taught that if plants are supplied with a sufficient quantity of their constituents, they will obtain all the ammonia they need from the atmosphere. Mr. Lawes' experiments show this partly right, and mostly wrong. They show that wheat, which contains only a comparatively small quantity of nitrogen, (ammonia,) requires for a maximum crop, very much more ammonia than the atmosphere and rain can supply under the most favorable conditions. On the other hand, they show that beans, peas, tares, and turnips, which contain much more nitrogen than wheat, are enabled to obtain nearly all the nitrogen and ammonia they require, from the atmosphere and rain-water. Mr. Lawes thinks it not improbable that the other cereals commonly cultivated require, like wheat, a much larger quantity of ammonia for their maximum growth than they can obtain from rain and air; and that, as these generally command a high price, and farmers wish to raise them as frequently as possible, every available means should be used to increase the supply of ammonia on the farm. But, as Liebig denies that these experiments lead to any such conclusions, let us briefly glance at the principal results obtained.

Three fields, with the general character of the soil and previous treatment as much alike as possible, were set apart for these experiments, some 17 years ago. Four crops were grown without any manure, and removed from the fields before the experiments proper commenced. One or more plots in each field were always left without any manure, and the others received a variety of the various organic and inorganic fertilizing substances. The first year, on the wheat field,

The unmanured plot yielded 16 bushels per acre.

14 Tons farm-yard manure, on a plot adjoining, 22 bushels.

The ashes of 14 tons farm-yard manure, 16 bushels.

Mean of 9 plots, dressed with artificial mineral manures, 16½ bushels.

Mean of 3 plots with artificial mineral manures, and 65 lbs each of sulphate of ammonia, 21 bushels per acre.

With turnips, the first year, the unmanured plot gave 4 1-5 tons of bulbs per acre.

12 Tons farm-yard manure, 9½ tons.

56 Pounds sulphate of ammonia, less than 7 tons.

4½ cwt. superphosphate of lime, 12½ tons.

From these few experiments, which we select from a large number giving similar results, it will be seen that even the first year shows a great difference between the manurial requirements of the wheat and turnips. On wheat, a heavy dressing of superphosphate of lime, phosphates of magnesia and potash, and silicate of potash, gave an increase over the unmanured plot of only three pecks per acre; while on turnips, the superphosphate of lime trebled the crop. The 56 lbs. of sulphate of ammonia per acre, which had such a good effect on wheat, had little effect on turnips, giving only about half as large a crop as the superphosphate of lime.

The second year, the same unmanured wheat plot gave 23 bushels per acre.

14 tons farm-yard manure, 32 bushels; and 168 lbs. each of sulphate and muriate of ammonia, 33½ bushels.

One plot, which received the previous year superphosphate of lime without benefit, was this year left without any manure, and the yield was 22½ bushels, or half a bushel less than the plot continuously unmanured.

The same unmanured plot the second year, on turnips, produced 2 1-5 tons of bulbs per acre.

5 cwt. superphosphate of lime, 8½ tons.

4 cwt. superphosphate of lime, with 56 lbs. sulphate of ammonia, 5½ tons.

It is remarkable that while on the unmanured wheat plot the second year, the yield was 23 bushels, the crop on the unmanured turnip plot was only 2 1-5 tons of bulbs per acre; and while sulphate of ammonia is again so beneficial on wheat, it has no influence on turnips; on the other hand, superphosphate of lime which is attended with little or no increase on wheat, gives a great increase of turnips—four times as much as the unmanured plot!

The third year the same continuously unmanured plot yielded 17½ bushels per acre.

On another plot, from which, the previous year, a large crop was taken by the use of ammonia salts, but which was this year left unmanured, the yield was a little over 17½ bushels.

This is again nearly identical with the plot continuously unmanured, and shows conclusively that the ammonia is all assimilated the first year. Does it not, also, on the other hand, discountenance the popular notion that ammonia is a stimulant, acting on the plant as alcohol on the animal organism?

224 lbs. sulphate of ammonia alone, gave 27½ bushels.

The ash of 3 loads of wheat straw gave 19 bushels.

The ash of 3 loads of wheat straw and 224 lbs. sulphate of ammonia, 27 bushels, nearly identical with the yield obtained from the same amount of ammonia alone.

448 lbs. of Liebig's wheat manure gave 20½ bushels.

448 lbs. of Liebig's wheat manure, and 112 lbs. each of sulphate and muriate of ammonia, gave 29 bushels.

14 tons farm-yard manure gave 27½ bushels, or precisely the same amount as that obtained from 2 cwt. of ammonia salts alone.

The third year, the same unmanured turnip plot produced only 13½ cwt. of bulbs per acre.

6 cwt. of sulphate of ammonia, 3½ tons.

534 lbs. superphosphate of lime, nearly 13 tons.

3 cwt. of sulphate of ammonia, in addition to the same amount of superphosphate, gave no more, but rather less, than the superphosphate alone.

11 cwt. of superphosphate of lime gave 14½ tons.

The same amount of superphosphate, with 3 cwt. of sulphate of ammonia in addition, gave 14 tons and a half.

We may here remark—and we call particular attention to it, as showing that it is the phosphoric, and not the sulphuric acid, to which superphosphate of lime owes its efficacy as a manure for turnips—that 12 cwt. of sulphate of lime gave less than 5½ tons; and the same amount of sulphate of lime, with 3 cwt. of sulphate of ammonia in addition, gave only 4½ tons, while superphosphate, with and without ammonia, gives 14½ tons.

We might extract from these extensive and long continued experiments many more similar results for other years, but surely we have given enough to show that so far as applied to wheat, the mineral theory, as taught in the extracts we have given from Liebig and his followers, is at fault; and also that for turnips, while the rain and atmosphere are capable of supplying to a great extent the ammonia they require, and that it is partly true that the crop "increases or diminishes in a direct ratio with the supply of mineral elements capable of assimilation;" yet it is evident that the proportion in which mineral elements are required, are precisely the opposite of what the analysis of the ashes of the turnip would lead us to expect.*

* Our limited space has compelled us to leave out the results of repeated applications (of potash,) of which the turnip ash contains some 40 per cent., soda, magnesia, &c., but we may remark that they were attended with little or no benefit.

The experiments in *Geescroft*, on beans, peas, and tares, show that these plants, which contain such a large amount of nitrogen, are benefited little if any by an application of ammonia or nitrogen. The same, to a certain extent may be said of clover. There is evidently great difference in the manurial requirements of wheat, and probably of the other cereals, and those of turnips, beans, peas, tares, and clover. The mineral theory of Liebig, indeed, points out a difference, but it is the *very reverse* of what the above experiments and others which might be brought forward, show to be the case.

Liebig claims these experiments as a practical confirmation of his theory; and by suppressing some of the principal facts, mistaking others, and seizing on one or two results that are manifest exceptions to the general indications of the experiments, and by a series of ingenious special pleadings, he endeavors so to twist the results as to make them sanction the mineral theory. Let us examine the arguments of the great chemist.

From the facts that the unmanured wheat plot yields annually about 18 bushels of wheat per acre; that the addition of a great variety of mineral manures gives little or no increase; and that the addition of ammonia alone gives a great increase, we had concluded that this field contained an abundance of all the mineral elements of plants capable of assimilation, and that the reason why it produced 18 bushels per acre, instead of 28, as when ammonia was used, was to be attributed to a lack of ammonia. In other words, that wheat on this soil, cultivated after the most approved methods, hand-hoed thrice in the spring, abounding in all the mineral elements of plants, was not able to obtain sufficient ammonia from the atmosphere for a maximum crop. Were this admitted, the dearly cherished mineral theory must be given up; and Liebig, therefore, endeavors to prove that the reason why 18 bushels per acre only were obtained, is attributable to a deficiency of available minerals. He asserts that the cause of the beneficial effect of the sulphate of ammonia is due to its solvent action on the phosphates of the soil; and that it simply or principally acted by rendering an increased amount of the mineral elements of the soil capable of assimilation.

We would ask, in reply, if maximum wheat crops were not obtained from lack of soluble phosphates, &c., why it was that an application of soluble phosphates, &c., did not increase the crop? They were used in various forms and proportions, without stint, yet they

gave no increase, and Liebig's own patent wheat manure failed. If, moreover, sulphate of ammonia acts merely as a solvent of phosphates, &c., how does it happen that the large amount used on some of the turnip plots is attended with little or no increase, while soluble phosphates artificially applied, give an astonishing increase.

It is impossible to answer these questions, and accordingly Liebig endeavors to show that the increase of turnips, from an application of superphosphate of lime, is not due to the soluble phosphate of lime which it contains, but to the sulphate of lime necessarily associated with it.

English farmers will be glad to learn that it is simply the sulphate of lime the superphosphate contains that benefits their turnip crop, and that they can obtain the same effect very much cheaper from gypsum or plaster. We have no doubt that half a million dollars worth of superphosphate was applied to the turnip crop of England last year, the greater portion of which might have been saved by a knowledge of the fact discovered by Professor Liebig!!

Some will ask on what evidence our author bases this opinion. We answer, on one solitary result, taken from Mr. Lawes' experiments—a result in direct contradiction to the general indications of the investigation, and in opposition to the results of other experiments on turnips, with superphosphate, sulphate of lime and sulphuric acid—a result, in short, which is *simply a typographical mistake*.—Liebig says:

"A like plot in 1845, which received 12 cwt. of gypsum, (residue from the preparation of tartaric acid,) and 10 cwt. of rape-cake, yielded 18 tons, 1 cwt. of turnips, *six tons more* than those fields on which phosphoric acid was employed. * * What strange results do these facts offer,—in what incomprehensible contradiction do they stand to the views of Mr. Lawes."

On referring to our copy of Mr. Lawes' paper, we found a marginal note, made years ago, stating that the 18 tons, 1 cwt., should be 10 tons, 1 cwt. It is much to be regretted that this mistake was not marked in the copy sent Professor Liebig; or that he did not discover the error, as he might have done by referring to the tables on the two following pages. Few will be surprised, considering the immense amount of tabulation in Mr. Lawes' papers, that a printer, should in one instance, place an 8 instead of a 10, but it will astonish many to find that on this *single mistake*, Liebig should adopt a view which is not only opposed to the general indications of the whole series of experiments, but is also at

variance with the experience of every farmer who has used superphosphate of lime and sulphate of lime of lime as a manure for turnips.

This error corrected, the opinion based upon it falls to the ground, and with it the idea that the beneficial effect of sulphate of ammonia on wheat is due to its rendering the phosphates of the soil soluble. Soluble phosphates greatly increased the turnip crop, but the *same soluble phosphates*, on similar soil, did not increase the wheat crop; sulphate of ammonia did not increase the turnip crop, but did greatly increase the wheat crop; therefore sulphate of ammonia does not act simply in furnishing to the wheat plants soluble phosphates.

Mr. Lawes repeatedly alludes in his papers to the fact that though the increase of wheat over the unmanured plot was in pretty direct ratio to the quantity of ammonia applied to the soil, yet that the increase was never so great as theoretical considerations would lead us to suppose. Thus, estimating a bushel of wheat and its proportion of straw, to contain a pound of nitrogen, it might be supposed that if nitrogen was wanted, a pound of nitrogen, applied in soluble ammonia salt, would give an extra bushel of wheat; but this is not the case. Without making any pretensions to settle the *exact* amount, Mr. Lawes estimates, from the immense number of instances in which ammonia has been used, in various ways and proportions, in his experiments, that five times as much nitrogen, in the form of ammonia, is required to produce a bushel of wheat, as it contains when grown. This estimate has stood the test of many trials, and is in accordance with the well-ascertained effects of Peruvian guano on wheat. Mr. Lawes sounds on this fact some very important practical suggestions, but which we cannot at this time refer to. Liebig *takes no notice of this opinion*, and refers to the loss of ammonia in these experiments, as though it had escaped the attention of Mr. Lawes, and as though he were the first to point it out. and he proceeds to show that the increase "bears no relation whatever" to the ammonia added to the soil. This is proving far too much, even for Liebig's own theory of the action of ammonia as a solvent; but let that pass. The method Liebig adopts to get at this result, is as follows: 60 lbs. of ammonia, say, give in 1844, an increase on the unmanured plot of 10 bushels. This increase contains only 15 lbs. of ammonia, and therefore Liebig estimates that "*beyond all doubt*," 45 lbs. of ammonia are left in the soil for the next crop. In 1845, 60 lbs. of ammonia again give an increase of 10 bushels; but Liebig adds to this the 45 lbs. which he assumes remain in the soil from the previous year, making 105 lbs.; and in this way he proceeds, adding the ammonia he supposes to remain in the soil to that applied each year, and from the figures obtained proves that the increase bears no pro-

portion to the supply of ammonia! We believe this method of estimating the action of ammonia fundamentally erroneous. Certainly we do not know of a single result, in these or any other experiments, that shows the ammonia of soluble salts to remain in the soil over one year, when wheat is grown, and when sufficient minerals are present to enable the plants to take up all the ammonia they require. Let us suppose a case, and one which is clearly deducible from the experiments. The continuously unmanured plot gives 15 bushels of wheat per acre; a plot adjoining, dressed with 30 lbs. of ammonia, gives 20 bushels per acre; another lot, dressed with 60 lbs. of ammonia, gives 25 bushels; another, dressed with 90 lbs., gives 30 bushels; and another, receiving 120 lbs., 35 bushels per acre. The next year, all these plots receive no manure, and the produce is the same on each, neither more nor less than that from the continuously unmanured plot. What deductions should we make from such facts? According to Liebig's view, the first plot would contain, the second year, no ammonia; the second plot would contain 24 lbs. of ammonia; the third, 48 lbs.; the fourth, 72 lbs.; and the fifth, 96 lbs. of ammonia per acre. Now, if this be true, surely the produce would not be alike on all the plots! A direct application of ammonia has always given a definite increase, and we cannot see why the ammonia remaining in the soil from the previous year should not also give an increased yield. The fact that it does not is clearly established, not only by these experiments, but by the experience of hundreds of practical farmers, who have used salts of ammonia, Peruvian guano, &c.; and we feel warranted in concluding from these facts, that ammonia is all used up the first year—unless Liebig, or those who agree with him on this point, can bring forward better argument to the contrary, than the simple, unsustained assertion that it is “perfectly impossible.”

Is it not more consistent with the facts of the case to suppose that the ammonia, being quite soluble, is all taken up the first year; and that in the growth of wheat there is, for some purpose or other, a great destruction of ammonia? It is well known that plants give off oxygen, and in the absence of light, carbonic acid; why may they not also give off ammonia? Chemists have always had a difficulty in accounting for the manner in which silica is deposited on the straw of the wheat plant. Prof. Way has shown that ammonia and silica, in certain double salts, form slightly soluble compounds, and he suggested that in this form the silica and ammonia is taken up into the plant; and that when the silica is deposited, the ammonia evaporates into the air. Our object is not here to decide whether this be so or not; we wish merely to show that Liebig has no right to assume, as he has done, that it is “perfectly impossible” for plants to take up more ammonia than they contain when grown, and found an argument on the assumption. He

would have shown a better spirit, had he met the views of Mr. Lawes and Prof. Way on this point with some argument, rather than by ignoring them altogether, and reasoning as though nothing had been said in regard to it.

The whole question appears to us to turn on this very subject, which Liebig has entirely overlooked in his review of Lawes' experiments. If it be true that wheat and the other cereal grasses need for their production a much larger quantity of ammonia than they contain when grown, and if, on the other hand, turnips, beans, peas, tares and clover do not, we have at once an explanation of those gradually developed systems of rotation which an enlightened experience has proved judicious. We see at once why two grain crops should not follow each other; why clover and peas and beans are the best crops to precede wheat, and why the turnip, in the Norfolk system of British agriculture, is such an excellent crop to precede barley. Indeed, we do not know of one solitary well-established fact that is opposed to this view; and surely, if it be correct, nothing can be more important to a correct understanding of rational agriculture. It is true, that it points to no revolution in our present system of culture, and in this respect will be less acceptable to all ultra reformers; but it explains the rationale of the most approved systems of rotation and general farm management, confirms what practical farmers have previously but indistinctly perceived, and urges them to carry out still further, and by more economical methods, a system of improved culture they have already commenced.

In Germany Liebig's pamphlet has produced considerable excitement. Dr. Wolff, Professor of Chemistry in the celebrated Hohenheim Academy of Agriculture and Forest Culture, and a man who, in the language of Mr. S. W. Johnson, of Yale College, unites “eminent scientific ability with practical knowledge,” has written a masterly reply to Liebig, and enters warmly into the defence of Messrs. Lawes & Gilbert, whose scientific reputation the great advocate of the “mineral theory” has savagely assailed. This has called forth another paper from Prof. Liebig, and which has been translated by Mr. S. W. Johnson, and will be found in the “Country Gentleman,” (Oct. 11, Nov. 8). The greater portion of it has only a remote bearing upon the subject under discussion. Prof. Liebig appears to avoid, as much as possible, the real issues of the question. When the result of any of Mr. Lawes' experiments throw doubt on Liebig's views, he cries out, “Must not every farmer see that conclusions founded upon experiments conducted in a manner so rough, so utterly lacking circumspection, are utterly valueless!” But when any of the results of these same experiments confirm any

of Liebig's opinions, he tells us, "The facts which he" (Mr. Lawes) "has ascertained, teach so many important doctrines in reference to the cultivation and manuring of the soil, that I hold them to be of very special value to the theory of agriculture." And in another place he says of these "*utterly valueless*" experiments, "It must be acknowledged, what I said at first, that of all the investigations that have been made, none are so eminently adapted as his" (Mr. Lawes') "to advance the mineral theory." "Mr. Lawes' experiments *demonstrate*"—"The trials of Lawes confirm this view"—"Mr. Lawes has *proved*"—"But the experiments of Mr. Lawes furnish perfectly definite and *reliable* facts relative to this subject"—"The results of Mr. Lawes demonstrate precisely"—"From the result of Mr. Lawes it is perfectly certain"—&c. &c.

To us it is "perfectly certain" that the same experiments cannot be "*utterly valueless*" and of "very special value," and we are quite unable to understand how "experiments conducted in a manner so rough, so utterly devoid of circumspection," can "demonstrate," or "prove," or "disprove," or render "perfectly certain" anything at all; and yet "of all the investigations that have been made, none are so eminently adapted to advance the mineral theory." "Indeed," exclaims Liebig, in another place, "I consider them the *firmest support* of the theory." This is proving too much. The mineral theory is confessedly a deduction, and the inductive experiments which are its firmest support are "*utterly valueless*."

But to the question. As we have said, Mr. Lawes found a definite increase of wheat from an application of ammonia to a soil abounding in all the mineral elements of plants. But under the most favorable circumstances he has never obtained as much nitrogen in the increase of grain and straw as was supplied to the soil in manure. He concludes from this, that in the growth of wheat there is a great loss of ammonia. Without attempting to determine the exact proportion, he states that his experiments indicate that for one pound of nitrogen (ammonia) organized in the wheat plant, five pounds are evaporated into the atmosphere, and are lost to the farm. On the other hand, his experiments with turnips, clover, beans, peas, and tares, prove that in the growth of these so-called "fallow crops," no such loss takes place. Liebig, as has been stated, took no notice of these views of Mr. Lawes, but Dr. Wolff has forced them upon

his attention; and in his reply to Dr. Wolff Liebig alludes to them as follows:

"In the writings of experienced agriculturists, I find as quite a general rule, that they do not hold a field rich in ammonia (freshly dunged) to be especially adapted for the cultivation of wheat, but recommend some other crop (potatoes) to precede wheat on such soils.

"But the experiments of Mr. Lawes furnish perfectly definite and reliable facts relative to this subject. He has found that a field which had previously received no ammonia nor ammonia salts, can yield a medium harvest of 1125 lbs. wheat and 17.56 cwt. straw for seven years in succession, without any artificial supply of ammonia, and in the last years the yield was greater than at first.

"From this it is perfectly certain that a soil, otherwise good, will yield almost an average crop of wheat without an addition or excess of ammonia; and that, no matter what quantity of ammonia may have been contained in the soil originally, and given up to the plant, or lost, this loss was without effect on the crops of the succeeding years.

"It is therefore allowable to pronounce the assertions of Dr. Wolff—that wheat requires for perfect development more ammonia than the soil contains in natural form—that the soil suffers a loss of ammonia by the cultivation of wheat, becoming in consequence less fertile—are wanting all foundation in fact, because the results of Mr. Lawes demonstrate precisely the contrary. * * * The erroneous assertion of Dr. Wolff rests equally upon the erroneous interpretation which Mr. Lawes has given of the fact that ammonia salts increased the yield of his wheat field.

"While Mr. Lawes harvested 17 bushels wheat and 17½ cwt. straw from one acre of unmanured field annually for seven years, a plot of equal size and quality, which received in the first year 5 cwt. of dissolved bones, and 2 cwt. of silicate of potash, and in the following six years 326 lbs of ammonia salts (the average) annually, yielded 25 bushels, or a yearly increase of 8 bushels of wheat, and a corresponding larger produce of straw.

"Now, since this plot, as a part of the same experimental field, would undoubtedly have grown 17 bushels without any manure, he ascribed the increase to the action of the ammonia salts, without taking any account of what had been added the first year.

"Further, since in order to produce one bushel more of wheat than the unmanured plot would have yielded, Mr. Lawes added 41½ lbs. of ammonia salt; and since one bushel of wheat contains 1.2 lbs. of nitrogen, and 42½ lbs. of ammonia salts contain 6½ lbs. of nitrogen, he harvested in the grain and straw five times less ammonia than he added to the soil. This is the fact. The false conclusion that he deduces is, that the culture of wheat is accompanied by an enormous loss of ammonia, since, at the lowest estimate, 5 lbs. of ammonia must be added to the soil in order to get one bushel of increase per acre.

"In order to draw a general conclusion from the observed fact, i. e., to be able to speak of it as a matter of settled experience, Mr. Lawes should have determined, in accordance with the rules of research, the general conditions which determine the production of one bushel of wheat and the corresponding amount of straw in all

cases, as well as the special conditions which caused the increase in his experiments.

If now it is true that 6 lbs. of ammonia were necessary to produce one bushel of *extra yield*, and that of this ammonia 5 lbs. were lost (evaporated through the plant), it must also be true that 6 lbs. of ammonia were removed from the soil of the unmanured plot, to produce every bushel of *ordinary yield*, and of this ammonia 5 lbs. also were lost to the soil by volatilization.

"Since now the unmanured plot yielded in seven years 123½ bushels of wheat, it follows that the soil must have contained, or received from the air or rains, 618½ lbs. of pure ammonia, or 3850 lbs. of carbonate of ammonia (salts of hartshorn), and that in seven years this quantity of ammonia was rendered useless for future harvests by the wheat culture.

"Such a conclusion it is impossible to support by any fact. What we know with certainty is, that during seven years 21½ lbs. of nitrogen were annually removed from the soil of the unmanured plot by the crop grown upon it, or 149 lbs. in total. But how much ammonia was contained in the soil, and was consumed in the production of 17½ bushels of wheat, we know nothing about.

"Since, now, Mr. Lawes did not know how much ammonia the wheat plant requires from the soil in order to give one bushel of yield upon the unmanured plot, how could he know that for every bushel of increased yield (gain by manuring) precisely six pounds of ammonia were necessary?

"If it had accidentally occurred to Mr. Lawes to manure his field with four, five, or six cwt. of ammonia salts, instead of with 3½ cwt., and if in those cases the yield was not increased (as we may with certainty assume would happen) then he might with the same justice assert that the loss of ammonia is 6, 8, or 10 lbs. for every bushel of increased yield.

"Or if Mr. Lawes had applied ammonia salts at the rate of 2 or 1 cwt. instead of 3½ cwt. the acre, and then, after previous manuring with dissolved bones and silicate of potash (whose action he has not taken at all into account), had harvested the same increase of 8 bushels, his conclusion that the soil suffers a loss of ammonia would doubtless have been vastly modified. He has made the loss and not found it. The number 5 for the amount of ammonia, and the quantity 1 bushel for the increased yield, are not expressions for a natural relation between manure and crops. The first does not express the weight of ammonia necessary to produce a maximum of increase equal to 1, and ascertained by a series of observations, but is a mere stroke of fancy. It never seems to have occurred to Mr. Lawes to determine the minimum of ammonia which was effective upon his field in producing maximum crops."

The pith of the controversy lies here; and Liebig puts forth his whole strength. We have rarely met with a finer specimen of special pleading. It is, however, the only portion of his lengthy paper which is to the point. The case against Mr. Lawes is stated in as strong a light as possible, and no doubt many who read only one side, will be deceived by the plausible sophistries of this greatest, ablest, and, we

are sorry to add, most unscrupulous of controversialists. He seems to "stick at nothing" that will help him to make out a case. Nevertheless, we are glad that Dr. Wolff has succeeded in forcing him to attack Mr. Lawes' main position. We have given Liebig's whole argument, and will now briefly examine it.

It is true, as Liebig states, that Mr. Lawes' soil yielded 17 bushels of wheat per acre annually for seven years, without any manure; and we may add, indeed, for thirteen years. It is also true that mineral manures—the ashes of the wheat plant—alone, do not enable it to produce any larger crop. It is further true that 17 bushels "is almost an average crop of wheat." On the other hand, it is also true that where this same soil has been annually supplied with ammonia *alone*, much larger crops have been obtained—on an average of seven years, as Liebig admits, *half as much again*; and, we may add, last year (1854) as much as 34½ bushels per acre were obtained; and this, it must be observed, after ten successive crops had been grown (and removed from the soil) by the aid of ammonia alone. The province of Agricultural Chemistry, Liebig tells us, is to produce *more* grain and *more* meat, and not simply grain and meat, which have been produced for centuries without her aid. We fully agree to this; the object of agriculture is not to maintain merely, but to *increase* the productiveness of our fields. How can this be done? Liebig says truly that the 17 bushels of wheat annually grown on Mr. Lawes' experimental field, by the aid of good tillage alone, is "almost an average crop." But the object of Agricultural Chemistry, according to Liebig, is to *increase* the productiveness of our fields. This Mr. Lawes has done. Instead of 15 or 20 bushels of wheat per acre, he has grown 30 and 40 bushels, and in 1854 as high as 55 bushels; and, in a private letter recently received, Mr. Lawes informs us that some of the plots this year (1855) *more than double* the unmanured plot, the yield on which is still 17 bushels per acre.

On this soil, by good tillage alone, 17 bushels of wheat are annually grown. The object is to get a heavier crop. It was supposed that "as the crops on a field diminish or increase in exact proportion to the diminution or increase of the mineral substances conveyed to it in manure," superphosphate of lime, potash, soda, lime, magnesia, sulphuric acid, chlorine, and soluble silica, or the *ashes* of the wheat plant, would increase the crop; *but they did not*. Liebig's patent wheat manure was also tried in vain. But ammonia, in whatever form used, increased the crop. Six pounds of ammonia

gave an extra bushel of wheat. But this extra increase only contains nitrogen equal to one pound of ammonia, and it is supposed that the remaining five pounds are evaporated through the plant, and that this loss of ammonia is necessary to the growth of the plant, or, at all events, there are at present no other known means of enabling the farmer to *increase* his wheat crop over 17 bushels per acre.

Liebig denies that any loss of ammonia takes place; but he has no evidence, aside from Mr. Lawes' experiments, on which he bases his denial. His argument is this:—If the plot without manure produces 17 bushels of wheat per acre, and one with 102 lbs. of ammonia 34 bushels, and if the increase is due to ammonia, it follows that the 17 bushels grown on the unmanured acre must also have required and removed from the soil 102 lbs. of ammonia. This we must fully admit. But Liebig says: "Such a conclusion it is impossible to support by any fact." This is his whole argument. It is "impossible" that the soil should contain, or that the rain and air should supply, such a quantity of ammonia. A strange argument this, to be made by the very man who taught that if plants were supplied with a sufficient quantity of mineral elements in an available condition, they would obtain all the ammonia they required from the atmosphere; and that, in the language of Prof. Horsford, "the ammonia spread on fields in the ordinary distribution of barn-yard products, is of no moment. The quantity with usual falls of rain *greatly exceeds, in the course of a season, any conceivable supply by human instrumentality*" Now that it suits Liebig's purpose, we are told that it is impossible that the soil, the atmosphere, and the rain combined, could supply 102 lbs. of ammonia—an amount contained in 600 lbs. of Peruvian guano, or in 5 tons of good, or 10 tons of poor, barn-yard manure! Furthermore, Liebig, in his *Chemistry in its Application to Agriculture and Physiology*, when speaking of the quantity of ammonia brought to the soil in rain water, says: "If a pound of rain-water contains *only* one quarter of a grain of ammonia, then a field of 26,910 square feet must receive annually upwards of 88 lbs. of ammonia." An English acre contains 43,560 square feet; and according to this estimate, which we are given to understand is a low one, 142 lbs. of ammonia are brought to an English acre of soil by the rain which falls in twelve months. This estimate was made to show that farmers need not be at any pains to provide ammonia for their crops, as the atmosphere would supply a rich abundance—and, indeed, 142 lbs. of ammonia would provide

more nitrogen than the grain and straw of the heaviest wheat crop contains! Now, when Mr. Lawes contends that the atmosphere and rain-water cannot supply the wheat plant with sufficient ammonia for a large crop, because *it destroys ammonia during its growth*, Liebig turns round and oracularly declares this destruction "impossible," because "the soil" [of the unmanured wheat plot] "must have contained or received from the air or rain, *in seven years*, 618½ lbs. of pure ammonia." In other words, it is impossible this destruction should take place, because the soil, the air, and the rain combined, cannot furnish in a year 88½ lbs. of ammonia per acre, while, according to Liebig's own estimate, the rain-water *alone* furnishes 142 lbs. of ammonia. It is difficult to argue with a writer who resorts to such pitiable subterfuges.

We have brought forward what we deem conclusive evidence, that there is a great loss of ammonia in the growth of wheat. Liebig endeavors to set it aside by saying that the ammonia in Mr. Lawes' experiments acted beneficially because it rendered the phosphates of the soil soluble. We conceive that we have fully answered this objection. Assuming that the action of ammonia is in rendering the phosphates soluble, Liebig says:

"If it had accidentally occurred to Mr. Lawes to manure his field with four, five, or six cwt. of ammonia salts, instead of 2½ cwt., and if in those cases the yield was not increased (as we may *with certainty* assume would happen,) then he might with the same justice assert that the loss of ammonia is 6, 8, or 10 lbs. for every bushel of increased yield. * * * It seems never to have occurred to Mr. Lawes to determine the minimum of ammonia which was effective upon his field in producing maximum crops."

We trust Liebig had not Mr. Lawes' papers before him when he penned these sentences, otherwise he is inexcusable. Ammonia has been applied in these experiments in *hundreds of instances*, and in various proportions; and in all cases it has produced, where unaffected by modifying causes, an increase, within certain limits, in proportion to the quantity of ammonia; and in no single instance has an increase of wheat been obtained except by a great destruction of ammonia. Quantities of ammonia, varying from 14 lbs. up to 180 lbs. per acre, have been applied; and even in these extreme cases, the increase of wheat is in proportion to the ammonia supplied in manure: the former produced 21½ bushels, the latter 50 bushels of dressed wheat, or 55 bushels (of 60 lbs. per bushel) of total grain, per acre. The amount of ammonia applied to this latter plot would be contained in about 815 lbs. of commercial

sulphate of ammonia. And yet Liebig says we may "*with certainty assume*" that if Mr. Lawes had accidentally manured his field with 4, 5, or 6 cwt. of ammonia salts, he would have obtained no greater increase than from $3\frac{1}{2}$ cwt. Now, as we have shown, he *did* apply—not "*accidentally,*" however—*more* than 4, 5, or 6 cwt., and obtained a *proportional* increase. We may "*with certainty assume,*" therefore, that Liebig has made a great mistake on this point.

The objections which Prof. Liebig has made to Mr. Lawes' experiments, are so utterly without foundation *in fact*, that nothing but his great reputation renders them worthy of notice.

Our remarks are already far too extended, but we have just received the last *Journal of the Royal Agricultural Society of England* (Vol. XVI, Part 1,) in which we find a "Report to the Earl of Leicester, on experiments conducted by Mr. Keary, on the Growth of Wheat, at Holkham Park Farm, Norfolk, by J. B. Lawes," which affords much light on the subject under discussion. It is a report of an experiment in growing wheat four years in succession, by the use of the various organic and inorganic elements of plants, somewhat similar to that on the Rothamstead farm, with this important difference: The soil at Rothamstead is a heavy wheat soil; this in Norfolk is "a light, thin, and rather shallow brown sand loam," which, previous to the introduction of turnipculture by the late Wm. Coke, on this very farm, was considered incapable of growing wheat. A greater contrast than between it and the Rothamstead soil could scarcely be imagined. *And yet the results are the same.*

The same manures were applied to the same acre each year, and the whole of the produce removed. We have not space for the details, but the following are the aggregate results of the four years:

The first acre, on which no manure at all was used, produced in four years, $93\frac{1}{2}$ bushels, or an average of a little over $23\frac{1}{4}$ bushels per acre each year.

The second acre, dressed each year with 300 lbs. sulphate of potash, 200 lbs. sulphate of soda, 100 lbs. sulphate of magnesia, and 350 lbs. of superphosphate of lime (200 lbs. calcined bone-dust and 150 lbs. sulphuric acid,) produced, in four years, 92 bushels, or an average of 23 bushels per acre each year.

The third acre, dressed each year with 200 lbs. each of sulphate and muriate of ammonia, applied *in the autumn*, produced, in four years,

$125\frac{1}{2}$ bushels, or a little over $31\frac{1}{4}$ bushels per acre each year.

On the fourth acre the same quantity of ammonia applied *as a top dressing in the spring*, gave in four years, 124 bushels, or an average of 31 bushels per acre each year.

On the fifth acre, the same quantity of mineral manures (sulphates of potash, soda, and magnesia, and superphosphate of lime,) as applied on the second acre, and 200 lbs. each of sulphate and muriate of ammonia, produced, in four years, 145 bushels, or an average of $36\frac{1}{4}$ bushels per acre each year.

The sixth acre, dressed with a ton of rapeseed (2000 lbs.) each year, produced, in four years, $147\frac{1}{2}$ bushels, or an average of $36\frac{1}{4}$ bushels per acre each year.

The seventh acre, dressed each year with 14 tons of farm-yard dung, produced, in four years, $135\frac{1}{2}$ bushels, or an average of $33\frac{1}{4}$ bushels per acre each year.

Without manure the soil produced 23 bushels of wheat per acre; the addition of mineral manures alone gave no increase; ammonia alone gave an increase of 8 bushels; ammonia and minerals, an increase of 13 bushels. From this it is evident that the amount of minerals annually available in this naturally poor soil, were considerably in excess of the quantity of ammonia annually available from natural sources; in fact, that there were minerals sufficient for 31 bushels, while there was only enough ammonia for 23 bushels. But the quantity of minerals annually rendered available by the disintegration of the soil, &c., although considerably in excess of the *natural* supply of ammonia, was not sufficient for more than an annual crop of wheat of 31 bushels per acre. To obtain more than this, it was necessary to supply, in addition to ammonia, a greater or less quantity of the mineral elements of plants. When these were supplied, the produce rose to 36 bushels.

The fact that, under these circumstances the mineral manures were taken up by the plants, and gave an increased crop, is conclusive evidence that they were in an available condition, and that their failure, when used alone, in these and in the Rothamstead experiments, is attributable to a lack of ammonia in the soil, and not to their being in an unsuitable form or improper proportion. It demonstrates that although a soil abounds in the mineral elements of plants in an available condition, sufficient ammonia or nitrogen can not be obtained from natural sources for a full wheat crop. It is additional proof, if such were needed, that ammonia does not act solely, or

in any great degree, by rendering phosphates or other minerals soluble.

The ton of rape-cake was calculated to afford as much ammonia and minerals as were supplied in the artificial minerals and ammonia salts on plot 5. It also contained, in addition, a large amount of carbonaceous matter. It will be seen that the increase of wheat is nearly identical in the two cases, and it follows that the carbonaceous matter had no beneficial effect on the wheat crop. This also is a result exactly in accordance with the Rothamstead experiments.

Similar results to the above have also been obtained from experiments made on the farm of the Duke of Bedford, at Woburn, on a soil and subsoil naturally of the poorest possible description.

It will be recollected that Prof. Liebig endeavored to set aside the exceedingly important fact that turnips, which contain only a relatively small proportion of phosphoric acid, require in the soil, in an available condition, more of this substance than wheat, the ash of which contains five times as much as that of turnips. We showed that he founded his objections on a *single typographical error*, which he might have discovered on the next page. We shall not again allude to the results of Mr. Lawes' experiments on this point; they are so conclusive that he must be blind indeed who cannot see that they explode the idea that we can tell what manure is best adapted to this or that particular crop from an analysis of its ashes. Our object in alluding to the matter, is to mention that, in the last *Journal of the Royal Agricultural Society*, Dr. Augustus Voelcker, Professor of Chemistry in the Royal Agricultural College, Cirencester, England, gives an account of some experimental trials made on the farm connected with the College, to ascertain "the comparative value of different artificial manures for raising a crop of Swedes" or ruta bagas, the results of which also accord with those obtained by Mr. Lawes. We have not room for the details of the experiments, but will quote a few of the remarks of Dr. Voelcker:

"An extended experience has proved, in the most positive manner, the specific action of phosphatic manures, and the decided advantages which result from their application to root crops."

"Numerous comparative field experiments have established the superior value of superphosphate of lime as a manure for root crops, and have shown likewise that the greatest fertilizing effect of guano is realized by applying it to a white crop or to grass land."

"Ammonia does not exhibit the same powerful effect on other crops which it does on the cereals."

"Ammonia does not benefit root crops in an equal degree as white crops; whereas, phosphatic

manures exercise a specific action on roots, which causes them to swell, and thus to increase the crop."

"Phosphoric acid, applied in a form in which it can be readily assimilated by the growing plant, more than any other fertilizing constituent benefits root crops."

"On the whole, we may learn from these experiments, that the value of different artificial manures for a crop of Swedes, and no doubt also for other root crops, principally depends on the amount of phosphoric acid contained in them in a form in which it can be readily assimilated by the plants."

The experience of practical farmers also agrees with these experiments, in according to available phosphoric acid a high value as a special manure for turnips. One manufacturer alone sold, in Great Britain, last year, 14,000 tons of superphosphate of lime, to be used as a manure for—what? For wheat, which contains so much phosphoric acid? No; but for turnips, which contain so little.

To conclude, these results point to no "revolution" in agriculture; they simply throw light on the rationale of systems of rotation and general farm management, already adopted by practical agriculturists. They say: "underdrain your land, so that the rain water, as it filters through the soil to the drains, may leave its ammonia for the use of plants. Grow more clover, peas, beans, tares, lupines, turnips, and other plants, which will retain all the ammonia brought to them in rain and dews, or obtained from the atmosphere, the soil or manure. In feeding cattle, use that food which, other things being equal, contains most nitrogen, for the excrements will be correspondingly rich in ammonia. In short, in everything you do, let it be your aim to conserve as much ammonia on the farm as possible. In this you cannot go wrong, for there is no means of getting ammonia in any considerable quantity but what at the same time affords more of the mineral elements of plants, in proportion to the wants of wheat, and probably of Indian corn, barley, oats, and other high priced cereals, than it does of ammonia. To illustrate: good Peruvian guano is the most ammoniacal manure in the market; and yet it contains generally as much phosphoric acid as it does of ammonia; while, according to Mr. Lawes' experiments, a bushel of wheat removes from the soil five times as much ammonia as it does of phosphoric acid. In nearly all substances used as manure, the proportion of mineral elements relatively to the wants of the wheat plant is greatly in excess of the ammonia which they contain.

We cannot impoverish the soil of minerals, therefore, by growing large crops by the aid of such manures as are now in the market, if the straw and home sources of manure are properly husbanded.

But, the reader will ask, If we obtain large crops of wheat, corn, &c., by accumulating ammonia in the soil by the growth of turnips, peas, clover, &c.,

shall we not in this case impoverish the soil of minerals? Yes, it is possible to impoverish the soil in this way, but as turnips require for their growth more phosphoric acid than wheat and beans, and clover more potash, the soil will refuse to grow these crops from lack of minerals much sooner than wheat. As long as we can grow good crops of turnips, peas, beans, and clover, we may be sure there are sufficient minerals in the soil for the largest wheat crop.

Were the "mineral theory" correct, man would possess the power of utterly exhausting the soil; but according to the views we have set forth, this power has been wisely withheld from him. Impoverish it he can and does, but to exhaust it by any natural and economic means is beyond his power.



THE SOUTHERN PLANTER.

RICHMOND, APRIL, 1856.

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THE OHIO FARMING AND STOCK BREEDING COMPANY.

It strikes us that one of the most promising enterprises we have heard of for some time is the one which is described under the above heading in a late number of the Ohio Farmer.

It seems that a company of farmers, with, we presume, ample means, and of considerable experience, have formed a partnership for ten years, renewable at the end of that time, for carrying on farming and stock breeding. The stock is made up of shares of \$1,000, and the company will commence operations with \$20,000, cash paid in. They have purchased some 8,000 acres of land in Butler county, Iowa, near a railroad now in process of construction. They will immediately commence building and cropping, and in about a year will send out 50 or 60 brood mares, well selected and stunted to some of the best and most fashionable horses in Ohio. A like number of shorthorns—cows and heifers—will be sent out at the same time. Then the superintendent, Dr. Sprague, at present corresponding secretary of the Ohio State Board of Agriculture, will take charge of the farm. He—

Will open a set of books, prepared with a view to keeping a systematic account of operations on the farm; charging the farm with moneys invested in the land, in improvements, breeding stock, implements, labor, and all other investments and expenditures; giving credit for all produce sold or consumed, pasturage, moneys obtained from sale of stock, and (at the expiration of ten years, this being the lifetime of the partnership, but which may be renewed at pleasure,) the worth of the land upon closing up the affairs of the company. An account will also be opened with each breeding animal when purchased, charging for investment and keeping from year to year, giving credit for produce sold or retained for breeding from time to time. No horse stock will be sold, until some fifty young horses have attained sufficient age for service. These will, for six months or more previous to marketing, be thoroughly trained by a good horseman, gaited

and matched, and a guarantee for temper and speed furnished, when sold. A like number, or more, will thus be turned off each twelve months, together with a drove of fatted bullocks."

In addition to the superintendent, who is also secretary, the company have a president and treasurer.

We do not recommend any such plan as the best for conducting farming operations for any length of time, or with a view to profit to be derived thereby. There is too much of the socialistic principle for that; too much of the phalanx order. But we call attention to it as being a plan, if properly carried out, admirably adapted to bringing wild lands into a productive condition in the shortest time, and promising a speculation by subduing rather than by tilling them.

We know of several companies owning large bodies of land in western Virginia, who are expecting to realize their profit on the advanced value of the *unimproved* lands. But it must be very evident that if in addition to the purchase money of the fee simple, an outlay was made for clearing these lands at once, building on them, cropping and stocking them, and thereby rendering them attractive to emigration, that a much higher profit would be realized, and in a much less time. It is probable that most of the individuals owning these lands, have no more money to spare in their improvement, and that many of them are capitalists rather than practical farmers, and ignorant therefore of the means to be employed in reclaiming the territory. If which be the fact, they might increase their capital stock, even at low rates to incomers, in view of the speedy returns of the investment.

The organization of such an enterprise it is not our business to discuss, certainly not here. It is merely our duty to suggest a plan which *must* pay those who will carry it out, and which will advance the settlement of our wild lands by at least a quarter of a century.

The Index for volume 15, Southern Planter, is now ready for delivery. Subscribers who wish them can have them sent, on application at this Office, in person or by letter.

EXTRACT OF A LETTER FROM A SUBSCRIBER.

(Published by request.)

"Your article upon 'Overseers' treats of a very important subject. One point I hope you will not overlook in your continuation of the article—the *education of overseers*. Not teaching them 'the languages,' or even 'the sciences,' but removing from their minds the prejudices against the im-

provements in agriculture. I know of no better way of doing this, than by supplying them with well conducted agricultural journals; and by way of setting an example to my brother farmers, I hereby order a copy of the 'Planter' to be sent to ——— my overseer, and request you to charge me with the subscription. If our farmers generally would do this, it would be no very heavy tax upon them, while it would so increase your subscription list as to enable you to enlarge the size and extend the usefulness of the 'Planter.'"

A FAMILY GROUP IN THE VALLEY OF VIRGINIA.

If we do not in the following pleasing sketch by our friend J., recognise the individuals of the picture, we at least recognize the class as peculiar to a portion of Virginia in which we have—though in a different locality—spent some of the happiest as well as most instructive days of our lives.

In our cattle forays into the great Valley, we learned to appreciate and admire a people so different from our cis-montane fellow-citizens, that they can hardly be known, and certainly not appreciated, except in their own homes. Simple in tastes and unpretending in manners; reserved but warm hearted; prudent but not cunning; cautious but not designing; frugal in expenditure and wary in enterprise; manifesting most usually more of public spirit than of private generosity; giving freely to the stranger of what they have, and making him *feel* rather than *hear* that he is welcome—this admirable population rose in our estimation and swelled in our heart at each successive visit we paid them, and we deeply regret that distance and different pursuits will deprive us of future opportunities of increasing our knowledge of them.

Not to speak of the living, among whom we think we can remember some few friends, we may say in gratitude to the late excellent Major Robert Grattan, of the county of Rockingham, that it was he who first introduced us to the Valley, and illustrated in his own person the virtues we revere in his countrymen.

Near BROWNSBURG, Rockbridge, Va.
February 20th, '56.

MR EDITOR:—I have just read Mr Gilmer's communications in the Planter with pleasure, and I hope not without profit. I agree with him in saying that the Planter should be in the hands of every farmer in Virginia, and that through their instrumentality, they could make it a source of much valuable information.

It is said that as a man rises in social importance, his dinner hour advances. Some men of humble origin and great luck have eaten their way from plebeian twelve; all down the hours of the afternoon, and ended a glorious career by solemnly dining with royalty at eight o'clock. Splendid reward this for the labors of a lifetime!

The papers tell us, that the Queen of England dines at eight o'clock, P. M.; the higher nobility at seven; the ordinary country gentlemen at six; the professional people and richer classes of merchants at four or five; the shopkeeper at two or three;

clerks at one; and working men at twelve. It is of the latter class, the bone and sinew of our happy land, that I will say something.

I recently spent a night with a very worthy man and old friend; and it is of him and his family I will write, as I consider their patterns for the agricultural community. I have known this family nearly forty years, and the picture is as near correct as I can draw it.

The custom of this family has been, early to bed and early to rise, and as a consequence, they have become healthy, wealthy and wise, (as to general good management.) There are a half a score of children, nine out of ten are married and well settled. The boys, (as the old gentleman calls them,) all men of fine common sense, strict integrity, and great moral worth. Generally members of the church.

This fall, the heads of this family, if spared may celebrate the fiftieth anniversary of their marriage.

Thirty-seven years ago, I was first introduced to them, and from that time to this, have spent many nights in their hospitable mansion. It was common in those days for almost every good farm to have a distillery. There was one here, but the discriminating eye of the good father could not ask Heaven's blessing upon it, and it was abandoned long before the Temperance Reformation commenced.

The custom of the father of this family was to call up the household every morning the year round between the hours of four and five. In the winter season, you might see the lanterns moving about in different directions, to the stables, the mill, the smith-shop, &c. At a quarter to six, the horn sounds, and the family all come together for family prayers, none are permitted to absent themselves, if in good health; a chapter is now read in the Bible, a hymn sung, and a devout prayer offered to the Father of all our mercies, for his direction and guidance in the duties and labors of the day, with thanksgiving for mercies and benefits received. Breakfast is now announced. The family surround the bountifully supplied table; God's blessing asked upon the provision of his bounty. Soon the laborers hie away to the fields, or the work-shops. The father, the sons and servants, all go out to the different labors of the farm. All are now engaged till half past eleven or a quarter to twelve, when the horn again sounds for dinner.

By the time the teams are properly cared for, and the laborers' ablutions performed, dinner is on the table, say quarter to half past twelve. In the harvest months, when the days are long and the work hard, an hour or two is spent in rest. About sundown the laborers quit work; an early supper is eaten. The family again called together for evening devotion, before the children yet get sleepy, after which the family generally retire to rest, rarely later than nine P. M.

The father of this family has taught his sons and daughters to wait upon themselves, and never call a servant to do what they can do equally well themselves. They are models of industry, economy, and thrift. They are public spirited, charitable and social; all owning servants, but not ashamed to labor with their own hands. Their general health is good, and I do not know that there has been a death in this family, children or grand children, for near fifty years. Surely God has watched over them, and kept them; has smiled on them and approved their walk.

The manners of the good old pair are primitive, their mode of living plain, but abundant and substantial. Their hospitality proverbial.

25th.—I again resume my pen, to speak of my friend as a farmer. When he commenced business his means were limited, but from close application, good economy, and strict integrity, he has become possessed of a good estate, and might now retire and live on the interest of his money; but he is still an active man, superintending his farm and work-shops, being by nature a mechanic. His horses are always in fine condition, as is his stock of every grade.

His farming utensils are of the best kind, and always in good order, his lands are well tilled, and in proper season; and as a consequence he rarely ever fails having good crops. His fields are well grassed, and his hay crops abundant and of fine quality. The products of the farm are wheat, corn, oats, grass, cattle, horses, pork, butter and other minor matters. Having always something on hand that would command a fair price, and as every thing he offers for sale is in good condition, he rarely fails in getting remunerating prices. Everything passes under his personal supervision, and as his wish and prayer is to do what is right, he rarely does wrong; and I am satisfied never does so intentionally.

As before remarked, his family are all married and settled, but the youngest. As they paired off, each one received some substantial aid, and all are comfortably settled. If not wealthy, they are well to do, and perfectly independent; owing no man anything, but what can be paid when called for. This good old father informed me some years since, that his intention was, as near as he could, to divide his estate equally among his children.

Yours, &c.,

J.

MESSRS. LAWES AND GILBERT vs. LIEBIG.

The article in this number on the controversy between these distinguished experimenters will well repay the cost of perusal. It gives the substance of the whole controversy, and some of the most important and practical results of Messrs. Lawes' and Gilberts' experiments.

We are indebted for it to Joseph Harris of the Genesee Farmer, an agricultural chemist, whom we esteem and confide in as a candid, reliable and scientific man.

RARE FLOWER SEEDS.

We have recently received from Mr. James Vick, of Rochester, N. Y., proprietor and co-editor of the Genesee Farmer, a collection—not for distribution—of rare and beautiful specimens of flower seeds. They are a portion of what he has just imported from France, and will be found, we think, of very superior quality.

EXPLANATION TO SUBSCRIBERS.

Several of our friends are surprised, and some indignant, that their accounts are sent to them, when they have paid our agents.

The reason we send the accounts is, that the agents have failed to make returns, and cannot now be got to do so, though written to repeatedly and urged to settle. We therefore are ignorant who have paid and who have not.

Just now we are in a general muss with our subscribers in the Northern Neck, many of whom have paid our agent there, who has never paid us one cent.

We except all *amateur* agents, if we may so call our personal friends, who have kindly consented to act gratuitously for us. They have all, so far as we recollect, remitted punctually, and we are the more indebted to them in that they are acting without any compensation and are taking a good deal of trouble on their hands.

As we have one or two rather lengthy articles in this number, we shall defer the completion of what we had to say about Overseers until our next.

BLACKWOOD AND THE REVIEWS.

We have received from the publishers, Messrs. Leonard, Scott & Co., 79 Fulton street, New York—Woodhouse, Richmond—the February number of Blackwood's Edinburgh Magazine, containing a variety of articles, which we have not had time as yet to look into.

We have also received the January number of the London Quarterly, containing Table Talk, Reformatory Schools, Reviews of the Life of Fielding, Landscape Gardening, the Zoological Gardens, &c. The Table Talk is a good article, and the Landscape Gardening, and Zoological Gardens, are both very instructive and entertaining.

The Edinburgh and Westminster for January have also come to hand. In the former the articles headed respectively, Rural Economy of France and England, and the Minister Von Stein, and the Life and Writings of Henri Bayle, will well repay perusal.

In the Westminster we have only been able to read the article on German Wit, which is not particularly witty; but quite interesting, as it gives a sketch of the great Heinrich Heine, recently dead, and esteemed, next to Goethe, the greatest literary writer of Germany.

RELATIVE PROGRESS OF VEGETABLE FOOD IN THE UNITED STATES, AND THE INCREASE OF ANIMALS.

In two or three articles recently prepared for the Record, we have shown, first, that the increase of the classes engaged in the various branches of the arts and commerce was much more rapid than that of those engaged in agriculture; and second, that the town or civic population, was increasing much more rapidly than that of the country, or rural population. In connection with these facts, we may remark *en passant*, and as intimately connected with them, that the prices of agricultural products have been for several years gradually growing higher, while, on the other hand, the prices of

manufactured goods have generally declined. This rotation of prices is perfectly consistent with, and, indeed, is a direct consequence of, the former facts, which we have stated and illustrated in preceding articles.

We shall now proceed to inquire whether vegetable food, which is the basis of all animal life, has or has not increased in the United States in proportion to the increase of population. If it has, we, at least, whatever may be the case with others, have not lost ground in relation to the due support of animal life. If it has not, then all the boasts we so frequently see in the newspapers, about an unlimited power to supply Europe with food, is a mistake and a delusion. While we are obliged to use the returns of the census of 1850 as a basis, we are well aware that the crop of 1849, on which it was based, was comparatively a bad one, and the present crop (55) is a vastly better one. Nevertheless, it is probably true that the crops of 1854 and 1855, taken together, would not make more than an average production. Comparing, then, the crops returned in the two censuses of 1840 and 1850, and the increase with the increase of population, we shall get a very near approximation to the relative growth of food and population in the United States. In doing this, it is not necessary to give the smaller crops in detail, but only the large crops, which support men and animals, and with them the number of men, and the number of animals which are used as food. The latter is not essential, for vegetable food of some kind is the basis of all animal life, and therefore to determine the crops is to determine all. But the number of animals used for food will illustrate the conclusions, and therefore we give it.

In the table below, the first column gives the number for 1840; the second for 1850; the third the ratio of increase; and the fourth the variation from what *ought to have existed* in 1850, in order to be equal to the ratio of increased population:

	1840.	1850.	Ratio per cent.	Variation.
Population,	17,069,433	23,191,876	36	15,000,000
Bushels of—				
Wheat,	84,823,272	106,485,944	20	76,000,000
Corn,	377,831,875	592,071,104	57	76,000,000
Rye,	13,645,567	14,168,813	—	11,000,000
Oats,	123,071,341	146,584,179	20	20,600,000
Hay,	10,248,108	13,838,642	36	—
Cattle,	14,971,586	18,378,907	24	1,800,000
Sheep,	19,311,374	21,723,220	13	4,500,000
Swine,	26,301,293	30,254,213	15	4,600,000

Here it will be seen that there is a deficiency in everything, except corn; that is, there is less than there should have been in order to make the amount correspond with the increase of population.

In regard to corn, at least 15,000,000 of bushels of the increased product is used in whiskey, which enters not at all into food. Deducting this, we have the following results:

DEFICIENCY.	
Wheat, - - - - -	15,000,000 bushels.
Rye, - - - - -	11,000,000 "
Oats, - - - - -	20,000,000 "
Total, - - - - -	46,000,000 "
Increase of corn, - - - - -	61,000,000 "
Apparent gain, - - - - -	15,000,000 "

But it must be observed that wheat is almost exclusively used among the white inhabitants for bread; and that of corn we are now exporting (which we formerly did not) an amount equal to the apparent gain. On the whole, it is apparent that the increase of vegetable food, in the United States, has rather fallen behind than kept up with the progress of population. It is also apparent that, in future, the great staple in breadstuffs for us, and for the world, is the maize, or Indian corn. This is the only crop; even in our fertile country, which keeps up and goes beyond the increase of population. It may be well to look for a moment at the increase of this crop. We have the following data for a calculation, viz:

Corn crop of 1840, - - - - -	377,531,875 bushels.
" " 1850, - - - - -	592,071,104 "
Annual increase, 6 per cent.	
Crop of 1855 calculated on this basis, - - - - -	800,000,000 "
Probable crop of 1856, - - - - -	1,000,000,000 "

This increase, however, will not take place unless we find a foreign market, which we shall probably do. On this head we intend hereafter to give the data for supposing that the rapid increase of the corn crop will continue.

One of the most remarkable facts in relation to the diminution of the agricultural production, is that of the diminished relative increase of animals.

Take the following proportions:

Increase of population, - - - - -	36 per cent.
Do horses, - - - - -	14 do
Do cattle, - - - - -	23 do
Do sheep, - - - - -	13 do
Do swine, - - - - -	15 do

These are very instructive facts. They teach very distinctly some of the principles which have been silently at work to raise the prices of wheat, of beef, and pork; nor do we see from this state of things any remedy but the increased application of labor to agriculture, and, as there is no power to enforce this but the presence of a real scarcity, so we can see no permanent diminution of prices; nor

indeed a probable cessation of the rise, till high prices react in producing a renewed attention to agricultural employments.

There is another question connected with the production and consumption of vegetable food, of great interest and importance. Other parts of the world are even less fortunate than ourselves. The result is that there is a pressure upon this country to supply the wants of Europe. The export of breadstuffs at this time, is beyond anything this country has ever known. With high prices and a good harvest, this demand will be supplied for a time; but, as the facts above stated prove that our surplus, especially of wheat cannot be very large, it follows that this demand, if continued, will so far exhaust the country as to make prices still higher, and, in fact, almost exhaust the home supply of wheat flour. If this be repeated from year to year, where will it end? Can we increase the supply of wheat so as to meet a perpetual European demand for grain? or, must the people of Europe come here in still greater numbers? or, finally, as we just remarked, is not Indian corn the last resource and hope of nations?

Our opinion on this subject is fixed; that, as corn is the great staple of our country—is easily raised, and may be indefinitely extended, that this crop will go on increasing, at a very rapid rate, and it will be exported to Europe in immense quantities. In looking to the increase of vegetable food in the United States, we think it evident that the productions which are likely to increase most rapidly, are those of corn, potatoes, sugar cane, and grapes. If we are right in this supposition, the United States have yet before them a field of vast enterprise and profit in agriculture.

Since the introduction of Texas, the land suitable for the cultivation of the cane has been greatly increased. We suppose there can be no doubt of the capacity of Louisiana and Texas to raise a million of hogsheads of sugar, without any great effort. This is equal to a thousand millions of pounds—quite a large item in the general provision of food.

The vine is a recent and much smaller addition to our agricultural list. But large parts of the United States, and especially the valleys of the Ohio and the Missouri, are admirably adapted to the cultivation of the vine. The time is not distant when millions of gallons of wine will be made on the Ohio.

The potato is a native of America, but has been much less attended to in the United States than it ought to be. At 100 bushels per acre, which with suitable soil and culture

is a small crop, it is one of the most profitable raised.

We conclude, therefore, that while it is an entire mistake to suppose that the United States can supply the world with wheat, when the world has driven its agricultural laborers into the hot beds of cities; yet, the United States has a staple grain in Indian corn, which can supply the world, and there are new crops with which America can enrich itself.—*Railroad Record*.

Communications to the Virginia State Agricultural Society.

ESSAY ON BLUE CLAY.

By ROBERT HARRISON, M.D., OF PRINCE GEORGE.

[A Premium of Ten Dollars.]

I design in this communication to present to the consideration of the State Agricultural Society of Virginia, my experience in the use of blue clay and the effects resulting from its use.

My farm is located in the county of Prince George, three miles south of James River; the land is generally light, with a clay subsoil, but portions of it have no clay substratum. On portions of this farm marl is found varying in strength from 25 to 75 per cent. All the arable land has been marled in the proportion of 300, or more, bushels to the acre. And the most of this marling was executed at least fifteen years ago.

This marl is about six feet thick, mostly dry, of a buff color, containing clam shells, oyster and other shells, some perfect, others decomposed partially; next to this marl is found a blue marl, inferior in quality, of a blue color, abounding in sand. This marl contains very large bones, some of the vertebral bones measuring eight or ten inches in diameter. This blue marl is about four feet thick. Immediately subjacent is found this blue clay, of unascertained depth, but which has been excavated to the depth of twelve or fourteen feet. This clay in physical appearance presents a homogeneous mass, but by careful examination it is found to contain innumerable shining particles. This clay is blue in its appearance, feels and cuts like soap, tenacious but somewhat friable. By atmospheric exposure either at the pit or after having been applied to land it soon breaks up into small masses sufficiently fine to be spread with a spade or hoe, or even to be scattered with the hand, as I have sometimes used it as a top dressing to clover. Rain and freezing also sufficiently disintegrates it for agricultural purposes. I consider it one of our best fertilizers, not inferior to lime or marl, abounding in carbonate of lime. Its use was commenced by me more than twelve years ago. It was analyzed by Professor Hare, of the University of Pennsylvania, but I have misplaced the report. He was of opinion that it possessed no fertilizing property whatever. Professor Rogers, of the University of Virginia, also subjected it to anal-

ysis—"Composed, (he says) almost entirely of a silicious clay, having a few shining particles of mica.

Silica,	} almost entirely.
Alumina,	
Oxide of Iron, about 7 per cent.	
Carbonate of Lime, a trace.	
Sulphuret of Lime, a trace.	
Carbonaceous Matter, a trace.	

It abounds in Alumina, Bisulphuret of Iron, Sulphuret of Lime, Acid, Ammonia, and some other ingredients according to another analysis, but many grains of allowance should be made for the present infancy of agricultural chemistry.

The first experiment I made with this clay was upon a remarkably light piece of land that I was endeavoring to improve by the application of our common red clay; at the same time I hauled out about twenty bushels of this earth. It was here spread, sown in oats and clover seed; the clover vegetated upon all, but died out during the summer upon the land upon which the red clay had been applied, but continued to grow finely and luxuriantly where the blue clay had been applied; and during this year some of the stalks of clover grew to be knee high, and was the best on the farm. After this, I have continued to use it from year to year until I have nearly applied it to every part of the farm, and some portions twice, with very satisfactory results. Upon some portions of the light land I have known the blades of corn to turn yellow, but whether it was owing to a superabundant application of this earth or to other causes, I have not yet satisfied myself, but uniformly it makes the land produce more corn and the blades are of a deeper green. On wheat, the increased product, particularly on my light fields, has been very apparent, both in the growth of the straw and the number of bushels. This earth is particularly adapted to the growth of peas. I think I may safely say the growth of the vines have been nearly doubled since the commencement of its use. Now all my corn land is sowed down in peas, unless I am deficient in seed. This gives me an additional product of wheat, that I estimate at four to five bushels to the acre. This mode of getting a green fallow with peas I consider to be the more economical with me, and I get a more luxuriant growth. I avoid the trouble and expense of fallowing land exclusively for peas, and the trouble of getting in the peas is much less with the corn, for it is not necessary to give any additional ploughing, and I am not yet satisfied that the pea crop produces any detriment to the corn crop. But I have now an experiment in progress to ascertain the fact.

I have taken some pains to sow my land in eastern shore bean, and here again the value of this manure is very apparent, the beneficial effects being equal, if not greater, than when applied to peas; but this latter plant belongs to the pea tribe.

My usual mode of using it is by applying about a hundred and fifty bushels to the acre.

But this year I applied about two hundred bushels more to land that had had an application of an hundred and fifty bushels of this earth. My corn is decidedly better than it ever was on this field before, and the peas as luxuriant as if they had been heavily manured; but where this earth was applied this year the peas were much better than the peas on the land which had had an application of this earth three years ago.

It is true, for several years I have been remarking my lands, also with marked benefit; but it is only with the marl I remove to get access to the blue clay, as I consider I get more benefit from the latter than the former. This opinion is not peculiar to myself. Dr. A. Bryant, a farmer of Prince George, informs me that he has discovered greater benefit from the use of his marl than is manifested by that of his neighbors, and he attributes the superior benefit to the fact that he is in the habit of mixing about four feet of this clay, which he finds at the bottom of his marl pits, with his marl. So far as my experience goes, I have never used this blue clay to lands that had not been marled or limed. I carried some a distance of four miles, and applied it to land that had been limed—a close, stiff, tenacious soil; and applied it to clover with marked benefit.

This earth acts promptly. On one occasion, the clouds indicated rain; I ordered a boy to haul several loads and scatter it on clover, and in a very few days the benefit from its use was very apparent in the increased vigor and greenness of the clover. This earth is soluble in water. Soon after a rain, if one rides or walks in a field on which this earth has been spread, a strong sulphureous odour is manifest and rather unpleasant; the same may be discovered at the pits. This is much more evident after a rain than at any other time.

Again, another fact connected with the solvent powers of rain is, that vegetation is considerably increased in the direction of the descent of water where this earth has been applied on the sides of hills.

It is beneficial to lands that have not been limed or marled, to our knowledge.

Mr. W. Gee, of Prince George, who lives twenty miles south of James River, has used this earth, and also what is called olive earth, with decided improvement upon lands that had had no lime or marl; but this land may be naturally calcareous. This blue clay is found at the bottom of his marl pits; he applies about three hundred bushels to the acre. A portion of his land was remarkably poor and light; he observed it has been in succession of crops under the regular rotation, for a great number of years, and was unproductive, producing only about one and a half bushels of corn to the acre. After the application of this earth, without any additional manure, the same land produced about four barrels; wheat and clover also grew successfully.

Another fact connected with this earth is of a very important character. The sheep sorrel,

a plant common with us and remarkable for the acidity of its leaves, generally disappears after land has been marled or limed; but it reappears after the use of this blue clay and grows more abundantly and luxuriantly, and this is the most serious objection to the use of this clay. Now this fact presents a stubborn reality against some of the fashionable theories of the day. Hen peas are increased in quantity and are more productive; the eastern shore bean becomes more abundant, and the clover increased in growth and improved in color; corn and wheat increased by the application of an earth that causes the sheep sorrel to reappear on land from which it had disappeared by the use of marl and lime. From this and other considerations, I should infer that acidity is not opposed to fertility.

This earth also possesses the power of counteracting the injurious consequences resulting from an over application of the carbonate of lime, or what is popularly called marl-burnt land. The bisulphuret of iron being placed in juxtaposition with carbonate of lime, chemical affinities may produce new combinations. Sulphuret of lime may result, and productiveness the ultimate consequence, or the caustic properties of the lime may be neutralized. On my farm an example may be seen of a piece of land in which all vegetation was destroyed, mould, &c., gone, and the land presented the appearance of worthless sand, which has been restored to comparative productiveness by no other manure than this blue clay. This clay is usually hauled upon the land after it is broken up, suffered to remain until it breaks up into flakes or becomes somewhat pulverized, when it is scattered. Here we occasionally find round balls about the size of large marbles, presenting a dirty appearance on the exterior, but internally these balls are crystalline. To what principle, to which ingredient in its constitution are we indebted for its fertilizing property? Is it because its metallic oxide forms a base with which humic acid unites, and this combination is subsequently easily dissolved by rain water, and is thus assimilated by the growing crops—or may not this oxide form other combinations with lime or other inorganic substances—or may it not more properly be a positive manure, independent of chemical affinities or atmospheric combinations?

We are thrown upon the ocean of conjecture; theory may be piled upon theory, and one hypothesis upon another without affording satisfaction to the man of science, or without materially benefiting the agriculturist.

Professors Hare and Rogers inform us that alumina abounds in this earth. Who knows the effects of whale oil, fish oil, &c., uniting with this earth? It is impervious to water in its present condition in the pits. It may in this form retain other organic animal matter. But it is not my object to discuss a theory or advocate a system, but to invite the attention of farmers to the use of this invaluable fertilizer.

The effects of this earth on the appearance

of my land, on my growing crops, upon peas, vegetation, clover and eastern shore bean are positive realities, and I shall continue to use this earth so long as beneficial results follow its use.

Blue clay is considered by some to be a peculiar deposit, but we consider its fertilizing property depends in a great degree upon the animal matter formerly existing in the superincumbent marl, united with aluminous and ferruginous earth; for we have never heard of its existence with us, without being accompanied with marl, or unmistakable evidence that marl pre-existed. Does this not go to render it highly probable that they are intimately connected, and its efficiency dependent in a great degree upon the animal matter, previously existing in the marl above; also, from the decay of large whales, the bones of some now remaining, and yet found in removing the marl. This clay consists of many of the ingredients of guano, phosphoric acid, soda, potash, ammonia, and sulphuric acid.

Now phosphorus, sulphur, potash, and soda are found to exist in the ashes of plants.

In this earth are many of the essential ingredients of vegetable organizations; ready when dissolved to be absorbed, and assimilated by the growing crop, after its application to the soil.

In Vol. XIII. No. 4 of the Southern Planter, page 165, in an analysis of a fine blue clay, from Marlbourne farm, which consists of carbonate of lime, sulphate of lime, bisulphuret of iron, potash, soda, phosphoric acid, alumina, an oxide of iron, organic matter and water, silica, ammonia from the organic matter. In appearance and physical properties, Professor Gilham says: "This clay is like the blue clay mentioned in my essay, and I have but little doubt it is equally fertilizing." Agricultural chemistry has made rapid improvements, and yet the science may be said to be in its infancy. The agricultural community are under many obligations to Professor Gilham, for his valuable contributions to agricultural chemistry.

If the present surface of this earth was formerly the bottom of the antediluvian ocean, which seems to be the fact from the discovery of marine shells on the Pyrenean mountains, 10,000 feet above the level of the sea, and other evidences of a deluge; and the fact also established, from the discovery of the rhinoceros, an animal of the equatorial regions, and also the mammoth, in a frozen condition in Siberia and the arctic regions, this whole country must have been submerged by sea water, abounding in muriate of soda; and Sir Humphrey Davy informs us that muriatic acid, acting on animal or vegetable fibrine, albumen or caseine, changes it to a purple color. Therefore we conclude, this blue clay owes its color to the action of sea water on these organic constituents of animal matter. So the color itself would go to prove the probable presence of either animal or vegetable matter, neither does its chemical analysis conflict in the least with this supposition, but rather goes to establish the probability, that animal or vegetable matter, or both, in a decayed condition, exists in combination with aluminous and ferruginous earth.

Red clay is immediately in contact laterally with this blue clay, and the line of division is of an intermediate color.

From the application of this earth to our soil peas are increased in quantity, and are more productive; clover is increased in growth and improved

in color; corn, wheat and vegetation improved by the application of an earth, that causes the sheep sorrel to reappear on land from which it had disappeared by the use of lime or marl. From this fact and other considerations I should conclude that acidity is not opposed to fertility or increased productiveness. Now I do not think that sorrel seeds are carried in this earth, nor believe in spontaneous generations; but the lime having destroyed or neutralized the acid, necessary for the growth of sorrel, this blue clay restores it, or liberates it either directly or by combination, and the sorrel having the elements necessary for its growth restored, grows more luxuriantly after this earth, than it did previous to liming or marling.

I suppose the seeds of the sorrel had remained in the earth for years, and it only required the necessary material for its growth and development.

Now if the disappearance of sorrel is an evidence of the correction of the acidity of the soil, and the existence of a certain degree of alkalinity, then the reappearance of the sorrel is the evidence of the restoration of the acidity, and increased productiveness is the consequence, going to prove that acidity in a soil is not the cause of its poverty.

It is the generally received opinion in our vicinity, that our lands that have had an application of marl or lime, in sufficient quantity, are not troubled with sheep sorrel after these alkaline earths are fully incorporated with the soil. There are some exceptions to this rule, but what are the modifying circumstances we are unable satisfactorily to explain.

The sorrel (*Rumex acetosella*) is remarkable for the agreeable acidity of its leaves, which is chiefly dependent on the presence of the binoxalate of potash. Oxalic acid is formed in both the animal and vegetable kingdoms. It is found as an oxalate of ammonia in guano, which accounts why sorrel so frequently follows its use.

Many other plants besides the sorrel produce it, such as rhubarb, valerian and lichen. It is also produced from a diseased condition of the kidneys of animals.

Now the sorrel does not grow on all soils, but with us it generally grows on light and sandy soils, sometimes in isolated patches, again more generally distributed over a field. Now, this oxalic acid, which predominates in the sorrel, it is fair to conclude, must exist in certain localities favorable for its formation, and wherever it does exist we have a soil favorable for the growth of sorrel. But oxalic acid has a very strong chemical affinity for lime; so strong that it will unite with the lime that is presented to it, in combination with sulphuric acid or gypsum. Therefore whenever land is limed or marled, in which oxalic acid exists, an insoluble oxalate of lime is formed, and the necessary ingredient for the growth of sorrel is neutralized by the lime, and consequently the sorrel ceases to grow. This appears to our mind, a sufficient reason to account scientifically and satisfactorily for the disappearance of sorrel after liming or marling. Certain plants require particular ingredients for their growth. It is an acknowledged fact, that marine plants will not grow without the presence of muriate of soda. Why will the sorrel again grow after the application of blue clay and guano, unless they abound in acids or favor the generation of oxalic acid? It does exist in guano as an oxalate of ammonia. We know, from the constitu-

tion of oxalic acid; that vegetable decay and atmospheric air, would furnish carbonaceous matter and oxygen favorable for the development of oxalic acid. Thus we have attempted to account for the disappearance of sorrel by the union which takes place with lime by one of its ingredients, forming an insoluble oxalate of lime. In confirmation of the great value of blue clay, I send a letter directed to me by my friend and countyman and a most excellent farmer, Mr. Gee.

Thus I think is demonstrated, that this earth, in the quantity applied, is equal if not superior to Peruvian guano. Poor land that originally produced 4 bushels per acre, afterwards produced 20, an increase of 500 per cent. This earth, I consider very important towards the renovation of worn out land, and towards neutralizing the alkalinity arising from an excess of marl or lime.

ROBERT HARRISON.

Prince George, Va.

SANTA ROSA, Prince George County, Va.

October 15th, 1855.

To Dr. ROBERT HARRISON.

Dear Sir:—In compliance with your request, I send you a statement of my experiments made with blue clay, the substance we find beneath our marl beds, &c.

In 1849 I dug from pits about twenty thousand bushels of marl, and in getting out this quantity, I concluded to experiment with the two substances usually found above and below the beds of marl, called red and blue clay. The former contains no shell, but bears the prints of every kind usually found in the marl bank; the latter contains neither, nor does the application of the strongest acids detect in either the smallest portion of lime.

Adjacent to my pits, there is a piece of worn out land, of very light soil, and of about eight acres; which had been cultivated a great number of years without any improvement; this I divided into two equal parts; upon the one, I put three hundred bushels of the red clay per acre, and on the other, the same quantity of blue clay; had it spread broadcast and ploughed under. In the spring I planted the whole in corn; it came up well and grew off finely, and produced to my astonishment, twenty bushels per acre, each piece producing about the same quantity. This land had not produced more than four bushels per acre, in any year, for the last twenty-two years to my knowledge. In the fall, I seeded it in wheat, which grew off finely, and was a very luxuriant growth until the 14th day of May; on that day it was (together with all my crop of wheat,) entirely destroyed by a hail storm. I had seeded the land in clover, and such as escaped being destroyed by the hail was of fine growth. After remaining one year in clover, it was put in corn again, and produced a crop about equal to the first. I then put it in wheat again, which was of fine growth, but owing to injury sustained by rust, it produced a very indifferent crop. * * *

Yours, most truly,

WM. GEE.

For the Southern Planter.

NEGRO CABINS.

EDITOR SOUTHERN PLANTER:—I make no apology for offering you a few hints upon the construction and management of "Negro Cabins," as the subject is an important one, and the ideas I offer chiefly derived from a medical friend, in whose sound judgment both you and myself place great confidence.

The ends aimed at in building negro cabins should be: First, the health and comfort of the occupants; Secondly, the convenience of nursing, surveillance, discipline, and the supply of wood and water; and Thirdly, economy of construction.

Of course, the convenience of locality must be judged of by the builder. I only propose to consider

the subject in its economic and healthful aspect, and to this end recommend that negro cabins should be built of plank; have large glass windows and good chimneys; should be elevated at least two feet above ground, and never placed within less than 75 or 100 yards of each other. When inch plank is not worth above \$1.25 per hundred feet, I consider the plank house cheaper than either log or masonry. At this price the cost of plank for a house 16 feet square will not exceed \$15, for which sum I would not furnish, hew, haul and put up logs to build a house of the same size. The planking is put on up and down, and I use a double course of planking instead of narrow strips; this I find makes a very comfortable cabin both for summer and winter. If the builder choose to incur a slight additional expense, and should dress the outer course and give it a coat of paint, this, with a projecting eave and some cheap ornamental cornice, makes a very pretty house and obviates the necessity for sticking the negro cabin out of sight of the mansion.

Plank houses are considered by Physicians as more healthy for negroes than log, for the reason that there is constantly accumulating in and about the negro's house a vast quantity of animal matter in the form of excrements and emanations from the human body, which has fewer places of lodgment and is more easily removed from the plank than the log house. To form an idea of the strength of this matter, you have only to call to mind the odour of a sweating negro or the stench which pervades a room in which several of them are sleeping. The Doctors tell us that these smells are clouds of animal matter, absolutely capable of being weighed and seen as well as tasted and smell, and are constantly collecting in the walls and under the floors of negro cabins, and there rot and stink as any other putrescible matter—(you must excuse an unrefined word now and then, for to tell the truth, I can't find a synonyme for that word which would at all convey the idea I intend.) This is beyond doubt the frequent cause of disease and should be carefully provided against, and hence I recommend the elevation of the floor above the ground, with a view to the frequent cleaning up of this accumulated filth. On my own farm a few years ago, typhoid fever, a disease until then unknown upon it, broke out in an old negro cabin, closely underpinned, and which for many years had been used as a negro house. My family physician advised me to tear away the underpinning and have all the filth cleaned up. In doing so, I found an accumulation of foul matter in layers almost denoting the number of years it had been collecting, which required six loads of a common cart to haul off, and from which came a stench equal to the concentrated essence of all bad smells put together. I would not if I could give you or any other friend of mine an idea of its fetidness. I tore down the house and found the old logs impregnated with foul smells, which continued in them long after they were exposed to winds and rains. The old house was like the "vase in which roses have once been distilled," except that it wasn't exactly the "scent of the roses" that hung round it still.

The floors of negro cabins should be of plank rather than dirt, and should be dressed and jointed, but not nailed down, that every plank might be taken up occasionally and cleansed of any filth that may have settled upon them. Lime and other disinfecting agents should be freely used. Negroes should be well supplied with light. They "prefer darkness to light," and unless watched will exclude the light entirely from their houses.

Their houses should be provided with large glass windows, and when a pane is broken they should be made to replace it rather than fill its place with old rags. Light and air are necessary to the proper making of blood; and negro women and children, who spend so much time within doors, should be compelled to enjoy both these elements. They have to be forced to it, for in sleeping a negro will cover his head if his feet freeze, and thus breathe over and over again the same air, charged as it becomes with carbonic acid and exhalations of the body, and deficient perhaps in oxygen, the element so useful in making good arterial blood. It is considered by medical men, I believe, that this bad elaboration of blood develops lurking scrofula and even generates it.

Glass windows enable the negro to do much work "in doors," and are surely more convenient than lightwood knot in enabling the physician or nurse, in case of sickness, to examine the patient or minister to his wants. I think a doctor has just cause of complaint when forced to burn a negro's eyebrows off with a pine torch before he can get a sight of his tongue at mid-day.

Negro houses should be provided with chimneys that don't smoke. Air-tight stoves are liable to give negroes cold from the extremes of temperature they produce and are objectionable in that they give no light. The Franklin stove is well adapted to negro cabins, and was used by yourself while you lived in Albemarle. Any thing is better than a smoking chimney. On many of our Virginia Farms, I doubt not there is lamp-black enough accumulated in the breathing tubes of the negroes during the night to black the master's boots in the morning.

Cabins should not be placed at a less distance than from 75 to 100 yards from each other, for the reason that it is highly probable that infectious diseases, such as scarlet and typhoid fever, measles, whooping cough, and even small pox may not be communicated at that distance.

Yours truly,

R. W. N. N.

ALBEMARLE, Feb., 1856.

For the Southern Planter.

CORN PLANTERS.

MR. EDITOR:—I have tried several kinds of corn planters. The first was made by Sinclair & Co., Baltimore, which has received the premium at the two last fairs, but which I think is a very indifferent machine in many respects. It is so top-heavy that it will take one hand to keep it in proper position, and a more awkward implement I have never seen. After using this one probably in all one day, I laid it aside, and having an opportunity to get *Emery's Planter*, which was highly recommended to me, I purchased it and used it a good deal. The performance of the machine is very good, and I could recommend it, if it were made in a style to suit our latitude; but this is not the case. The gentleman from whom I got it commenced to repair his before getting it to the field.

If some of our Southern Manufacturers would make them in as durable manner as they make other implements for a home market, I do not doubt but what it would be used very extensively, especially by farmers who own large fields, free of stamps and roots.

In haste, yours truly,

RICHARD IRBY.

NOTTOWAY, Va., Mar. 14th, 1856.

For the Southern Planter. BELLS ON SHEEP.

February 6th, 1856.

Friend Ruffin:—In the January number of the Planter I saw an article upon bells "to prevent dogs from killing sheep." When a boy, I passed by Mr. Richard Sampson's farm, of Goochland county, one evening, and saw his servants penning his sheep with his cattle. I asked the reason. The boy said it was to protect the sheep from dogs. I remembered it, and have practised it ever since I have owned a sheep, which has been twenty odd years, and have never had a sheep killed or attacked by dogs; whilst my neighbors have sustained great damage, and some have had their entire flock destroyed. I have told my plan and my luck, and strange to tell, I do not know a man who thus pens his sheep; and there is not a man in Albemarle county, who has lost fewer sheep from any and all the evils to which this valuable stock are subject, than I have. Sheep cannot stand dirt, in or out of a pen; my cow pens are frequently moved or well littered, and the sheep always turn out the first thing in the morning, and after a little practice will come to the pens every evening themselves, as if for protection.

Yours respectfully,

G. C. GILMER.

P. S. My sheep boy would not hire for five dollars per year. This winter sheep have suffered much for shelter and for water. To do well, sheep must have water every day.

For the Southern Planter.

DITCHING.

February 7th, 1856.

FRIEND RUFFIN:—Yours of the 8th of January was received, and should have been answered, had this been the season for such work. You ask if I have ever tried ditching with the assistance of a horse and counter. I have for years done much of this work with two horses, a counter and plough, then scrape out with a cast iron two horse scraper, by which I easily and quickly remove all the dirt from the channel I wish to make, and deposit it in some washed or sunken place, thereby killing two birds with one stone. I can, and have done more work of this kind per day, with one man thus equipped, than could have been done in the old fashioned way of spading and shovelling by fifteen if not twenty as good hands. I do all of my straightening of my creeks, clearing out my mill race, and removing the sand bars, shoals, and obstructions in my creek with my horses and scraper. It is a great labor saving machine. I have never tried it upon the narrow or common ditches of the farm, but will try it as you advise, and inform you of its result and my opinion.

Yours, truly,

G. C. GILMER.

INGLEWOOD, near Cartersbridge
P. O., Albemarle co.

For the Southern Planter.

EXPERIMENTS WITH MANURES.

In April 1853, I made a compost of one ton Peruvian Guano, half ton of Plaster, and two tons of leached ashes. I applied this mixture in the hill to corn on about twenty acres of land, ten acres

low grounds and ten acres high land (or hills.) This experiment paid a larger profit than any I have ever made on corn. The distance was four feet by two, furrows for planting opened with a two horse plough, the corn dropped, and the compost upon it, and covered with a coultter; on the high land one stalk in the hill, on the low-grounds one and two alternately. The low grounds averaged about twelve barrels, and the high land about six barrels per acre. I think the yield in both cases was doubled by the application.

About the 6th of June, 1853, I applied two tons of Peruvian guano on corn at the rate of 150 pounds per acre, sowed in a narrow string about the corn and covered immediately with a mould-board plough, the dirt thrown to the corn. This application was on low grounds, and increased the yield per acre, I suppose, from two to three barrels.

Experiments with Guano and Kettlwell's Renovator.—On a piece of poor low grounds, containing 2200 square yards, I applied between the 5th and 10th of June, 1853, 75 lbs. P. guano, sowed close to the corn and covered immediately with the dirt thrown to the corn; gathered and measured three barrels and three pecks, making about eight barrels per acre. On the same quantity and quality of land, and immediately adjacent, I sowed and covered in the same way one barrel of Kettlwell's Renovator, costing here within a fraction of \$4, and gathered and measured two barrels and four bushels of corn. Difference in favor of guano, four bushels and 3 pecks.

4½ bushels corn at 70 cents \$3 32½
75 lbs. Peruvian guano at 2½ cents 2.06½

Nett gain \$1.26½ or about
\$2.75 per acre.

I do not conceive that the Renovator increased the yield at all, and I am led to this conclusion from other experiments I made with it. I sowed seventeen barrels of it on tobacco land in 1853, at the rate of one and a half barrels to the acre, costing per acre here nearly six dollars, and if it benefited the crop I am entirely ignorant of it. In order to give it a fair trial, I reserved two barrels and applied it in the hill to corn in 1854, according to Mr. Kettlwell's directions, and I could perceive no benefit whatever. Mr. Kettlworth advised its application with Peruvian guano if I had it, and without the guano if I had not. In my experiments I preferred to try it alone, and let it stand or fall upon its own merits.

In 1851 I used about four tons of Peruvian guano on corn land, sowed broad-cast and in the drill from 150 to 200 lbs. per acre; very little benefit was realized from this application, in the increase of grain, except on damp spots, but a decided increase in the quantity of fodder. I also applied two tons Peruvian guano on tobacco land, 300 lbs. to the acre, in 1854, without any decided advantage in the growth of the plant, but I perceive it thickened and ripened faster in the Fall and was ready for the knife earlier than that upon which the application was not made, thus availing any risk of frost.

In 1855 I selected damper land (but not subject to inundation) for the application of guano on tobacco, and applied from 300 to 400 lbs. per acre in the drill. This experiment succeeded admirably, and should the tobacco bring a reasonable price, a good per cent will be realized. The same year I measured one acre of poor land, very slightly manured with summer cow pens in 1854, and applied to this

piece a compost of 200 lbs. Peruvian guano, 200 lbs. leached ashes, 100 lbs. plaster, and one bushel table salt, costing about \$7, sowed in a drill, and the hills made upon it. This was a remarkably good piece of tobacco, and paid better for the outlay than any other experiment.

I have used stable (horse) manure with and without plaster in the hill for corn with beneficial results, especially so in a wet season. I consider there is but a slight difference in the yield of corn in favor of guano over this manure, but guano has the advantage in the smaller bulk to be carried to distant parts of the field and the greater rapidity and less labor in its application.

In my experiments with wheat, I have not been very successful, owing measurably to the advice of your contributors and farmers with whom I have conversed, as to the quantity to be used, from which the largest per centum could be realized. Taking that advice I used it at first too sparingly for this region to counteract the ravages of the joint-worm. From experience and observation I have learned that in this section of country, on poor land, unaided by other fertilizers, less than 300 lbs. Peruvian guano per acre will not pay well, and then the farmer may not calculate on much clear gain, unless he sell at high figures.

In 1853, I made a trial of one ton Peruvian guano on oats, sowed on high land, and have not since repeated the experiment; that being a dry season and the experiment consequently not succeeding well.

In dripping seasons guano acts charmingly on spring and summer crops. But the farmer will be disappointed in dry seasons, unless he be very cautious in the selection of the land for its application.

I agree with Mr. Noland, that rolling the seed corn in guano is worth the trial, if only to accelerate the growth of the young plant, so as to push it out of the way of worms and other pests; and moreover the great advantage, in my opinion is, to enable the farmer to work it earlier and get it in good order by harvest; for my little experience teaches me that in the main the working of the corn crop must cease then, unless the farmer has an extra force to keep his ploughs running in harvest time.

ROBERT N. TRICE.

MYCHUNK, near Keswick Depot,
Albemarle Co.

For the Southern Planter.

ROLLING SEED IN GUANO.

EDITOR PLANTER:—As there seems to be some diversity of opinion as to the effects of guano upon the germination of seed when the two are brought in immediate contact, I take leave to report my experience, which has been sufficient to satisfy my own mind upon the subject. I have practiced rolling grain in guano—both corn and wheat—for several years and have always found it to act beneficially, *when the grain is planted immediately after the application is made.* Last fall, however, I had a small quantity of rolled wheat left over from the day's sowing, which remained during the night in the guano. This failed to come up—not one grain in an hundred germinating—while the rest of the crop came up well. The contact with the clay, I presume, destroys the caustic property of the guano, which otherwise, if the article be good, is sufficient to prevent the ger-

mination of seed. The guano I used, I purchased of Fowle & Co., of Alexandria, and proved to be a very superior article, being perfectly dry and giving out a strong ammoniacal smell. The guano we buy, varies as much in quality as does the whiskey we drink, (that is not *we* exactly, but some of our friends,) and the article I got last fall was as far superior to the lot sent to this county from Baltimore, as "old Bourbon" is to S. & B.'s "Blue head." Good guano is dry and strong-scented, not wet and inodorous, as is much that is offered in our market. The farmers of Virginia need no inspection of guano. They should either judge for themselves, or deal only with merchants in whom they can place confidence.

It is the business of the commission merchant to acquaint himself with the means of judging of the quality of guano, just as he learns to distinguish between good sugar and bad. The loss to the State, from the use of inferior guano, is incalculable. The first cost of the article, is as nothing compared with the failure of crop from the application of worthless guano, for it seems now that wheat will not ripen well, even upon our very best lands, without the use of this fertilizer. Our farmers should be more particular in testing the quality of guano, and think less of economising a dollar or two in the price, for they may rest assured that a good article is cheaper at \$60 a ton, than some we use as a free gift. It may be true that "eggs is eggs," but it does not follow that everything sold under the name of guano will make a wheat crop. The best tests I know are *order* and *odour*. If guano be perfectly dry and give out a good strong smell, it may be depended upon. Clean bags usually contain the best guano, as any addition of water, either from sprinkling or atmospheric absorption, shows itself in the staining of the bags.

I take occasion, while upon this subject, to mention that I have experimented in a small way with Mexican guano, on tobacco, corn, and wheat, alone, and mixed with Peruvian, and have yet to see the slightest effect from it. My experiments have not been made with sufficient accuracy to demonstrate to others its worthlessness, but has satisfied me that that it is not quite equal as a fertilizer to common *Ivy creek sand*.

From the Papers of the Nottoway Farmers' Club.

COMPARATIVE EXPERIMENTS WITH GUANO.

FALLOWING IT IN AND PUTTING IT IN ALONG WITH THE WHEAT—DRILLED AND BROADCAST ON CORN.

In compliance with the constitutional requisition of our club, making it obligatory upon each member to report in writing the result of some operation or experiment made during the year, I report that, in the month of August, 1853, I applied 300 pounds of

guano to two acres of land then being fallowed with a two-horse plough for wheat; the remainder of the field was fallowed in the same way, but no guano was applied until October, the time of seeding, when about 150 lbs. per acre was sown, the guano and wheat both turned under with a one-horse turning plough, a portion immediately adjoining the first-mentioned two acres, and so nearly alike that I could not perceive any difference. The wheat was sown on both fields about the same time—perhaps the same day. The wheat on the first two acres was covered with a twenty-four tooth harrow. Throughout the season and at present the difference in favor of sowing guano and wheat at the same time was as four to one.

I would, as one of the committee appointed to test the value of guano applied to corn broadcast at the time of planting, and one-half the same quantity applied in the drill, the other half broadcast at the last ploughing, report that, in April, 1854, I measured two contiguous spaces of land, about 70 yards square each, of as nearly equal fertility and texture as could be obtained. To one acre I applied $3\frac{1}{2}$ bushels (estimated to be 200 lbs.) guano broadcast, and turned it in with a one-horse plough; to the other acre I applied $1\frac{1}{2}$ bushels guano in the drill at the time of planting. The drills were opened by throwing out one furrow each way with the single plough, the guano sown in the drill and closed by throwing back two furrows with the same plough. The drills for planting were opened with a trowel hoe—both pieces planted the same day and in the same way, except as above—the land inclining to sandy. At the last ploughing of the corn, I applied $1\frac{1}{2}$ bushels guano broadcast to the drilled acre—work done with the cultivator. The broadcast acre produced 4 barrels, 4 bushels and 3-16 of a bushel. The drilled acre, 4 barrels and 4 bushels corn. Both acres in all respects alike, planted at the same time, worked on the same days and with the same implements. Both suffered from drought, as did the rest of my crop.

WM. R. BLAND.

BEST MODE OF APPLYING GUANO TO CORN.

Mr. President: In accordance with a request of the club, the following experiments were made with guano on corn, in order to ascertain the best mode of its application.

I selected four acres of thin land, about the same quality. On the first I applied 200 lbs. of guano broadcast, and turned it under the 1st of March with a double plough.

On the second acre, I applied 200 lbs. guano in the drill, in the following way: The land having been previously fallowed with a double plough, furrows were made at the time of planting by running twice in a place with a single plough, in which the guano was drilled; a harrow was then run over it, which covered it two or three inches deep; the corn was then dropped and covered with harrows.

On the third acre, I used no guano.

On the fourth, I applied 100 lbs. of guano in the drill, in the same way as on the second acre; and at the second ploughing I applied 100 lbs. in furrows made by a single plough on each side of the corn, and covered with single ploughs. The results were as follows:

1st acre, 200 lbs. broadcast, produced 4 barrels, 4 bushels, and 3 pecks, at \$3 50,	\$17 44
2d acre, 200 lbs. in the drill, produced 3 bbls., 4 bushels, and 3 pecks, at \$3 50,	13 95
3d acre, nothing used, produced 1 bbl., 4 bushels, and 2 pecks, at \$3 50,	6 75
4th acre, 100 lbs. in drill and 100 lbs. at side, produced 5 bbls., 2 bushels, and 1 peck, at \$3 50,	19 16

In the above there is nothing said about short corn, as it was put at half price, and carried out in the estimate of each acre.

By adding to the product of the unimproved acre, which was \$6 75, the cost of guano and interest thereon for one year, (say \$5 30) and deducting the amount, \$12 05, from the product of the first acre, the remainder (\$5 39) will show the profit by the use of guano, applied broadcast. In the same way, \$1 90 is the profit by its use in the drill, and \$7 11 is the profit by its use as applied on the fourth acre.

But in order to ascertain more accurately the profits by the use of guano, we should charge for cultivation, which I will put down at \$5 per acre, which is moderate, supposing the laborer to find himself and horse; also \$5 30 per acre for guano when used. By this estimate, it will be found that the nett profit on the unimproved acre is \$1 75; on the 1st acre, \$7 14; on 2nd, \$3 65; and on the 4th, \$8 86. The result of the above experiments is decidedly in favor of using half the guano in the drill at the time of planting, and half at the second ploughing. I will state, in connection with these experiments, that the corn on the acre on which the guano was applied broadcast, looked decidedly better than any other until it was about three feet high, about which time that on the acre on which the 200 lbs. guano was used in the drill, overtook it. This acre, during the summer,

and even after the tops were cut, I thought would have produced at least a barrel more than any other, but to my surprise I found the 4th acre produced the most. This is an exemplification of the fallacy of judging as to the results of experiments by the eye.

Respectfully submitted.

WM. IRBY.

COMPARATIVE EFFECTS OF 300, 200, AND 100 LBS. OF GUANO ON AN ACRE OF CORN.

As one of a committee of three appointed to make experiments with guano upon corn, I have performed, very satisfactorily to myself, the duty assigned me by the club, and hereby report the results to which I have come.

The object of the experiments was, to test the comparative effects of 300 lbs., 200 lbs., and 100 lbs. of guano, on an acre of corn.

Being unfavorably situated, however, for executing my task, I have conducted the experiments only in a *pro rata* form; that is, a half acre of ground was selected and divided into four parts, or lots, each containing five rows of corn.

As late as about the 15th of May last, this plot of ground, which was poor and had been seeded to oats with guano the year before, was thrown into 5 feet beds with the single dagon, and planted with corn at 2 feet distance. Before fallowing, three of the lots had been dressed respectively with 38 lbs., 25 lbs., and 13 lbs. of guano each, while the fourth lot was left undressed, for comparison.

Besides being planted late, the crop was badly worked. It suffered, also, from the depredations of birds, especially the lot which was undressed—being an outside one, and remotest from the houses.

On the 30th of November, the corn was gathered and measured, as follows, (at the rate per acre:)

	Lbs. guano.	Bbls.	Bush.	
1st acre,	200	2	4,	exclusive of nubbias.
2d acre,	200	2	2,	" "
3d acre,	100	2	—	" "
4th acre,	—	—	4,	" "

Estimating corn to be worth \$3 50 per barrel, and putting guano at \$50 per ton, we arrive at the following results in gain and loss. Deducting in each case four bushels as the unaided product of the land.

	Bbls.	Value.	Cost of guano.	Gain.	Loss.
1st acre, 2		\$7	\$7 50		50 cts.
2d acre, 1 3-5		5 60	5 00		60 cts.
3d acre, 1 1-5		4 20	2 50	\$1 70	

On giving credit to the guano only for the increased crop produced by it, and allowing 1

barrel per acre to the unaided powers of the land, the result will be:

1st acre,	loss,	\$4 00
2d acre,	"	2 10
3d acre,	"	1 80

Respectfully submitted.

Notaway, April 12, '55.

G. FITZGERALD.

AGENCY.

For the celebrated Maaney Reaper and Mower, which possesses advantages over all other Reapers. Full information, or machines furnished upon early application to the undersigned, Special Agent for the counties of Loudon, Fauquier, Clarke, Frederick, and Warren, and General Agent for the State.

Warre Post, P. O.

J. J. HITE.

Clarke County, Va.

apr 26.

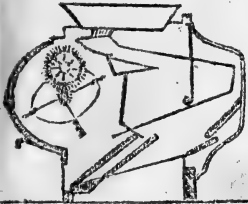
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LIST OF PAYMENTS

From 1st to 19th March, 1855.

S S Alsop, Jan 1857	1 00	C C Hightower, Jan 1857	1 00	Jas M M'Cargo, March 1857	1 00
Dr W T Banks, Jan 1857	1 00	E Hancock, Feb 1857	1 00	Gen W T Ballou, Jan 1857	3 00
Wm Hill, Oct 1855	3 50	L H B Whitaker, Jan 1857	1 00	W Dupuy, Jan 1857	1 00
B Hiner, Jan 1857	2 00	W J Lawrence, Jan 1857	1 00	J H Knight, Jan 1857	1 00
J A Montague, Jan 1857	1 00	M Cason, Jan 1857	1 00	R V Watkins, Jan 1857	1 00
T H Montague, Jan 1857	1 00	W Turnbull, Nov 1855	2 50	J J Scott, Dec 1856	1 00
Jos C Eubank, Jan 1857	1 00	S L Lewis Jan 1857	1 00	B S Scott, Nov 1856	1 00
W A Street, Jan 1857	1 00	Rev P Cleaveland, Jan 1857	1 00	F P Wood, April 1857	1 00
W C Stribling, Jan 1857	1 00	J H Carrington, Jan 1857	1 75	J D Ligon, May 1857	1 00
Gen W H Richardson, Jan 1857	1 00	Mrs L P Miller, Jan 1857	1 00	Jas W Walker, July, 1856	2 00
A E Smith, July 1856	2 00	R C L Moncure, Jan 1857	2 00	Maj J B Lee, July 1857	5 60
H Handley, Apr 1857	2 00	L R Rudasilla, Jan 1857	1 00	G Hairst, sr Jan 1857	1 50
R V Lockhart, July 1859	5 00	Jas Harding, Feb 1857	1 00	L Handley, Jan 1857	1 00
Geo Johnson, Nov 1856	1 00	H Hurst, Feb 1857	1 00	J J Ewin, Jan 1857	1 00
Jas C Kasey, Jan 1857	1 00	F Dunaway, Feb 1857	2 00	Dr C M Dowell, Jan 1857	1 00
Dr G G Minor, Jan 1857	1 00	C Harding, Feb 1857	1 00	T E Shannon, Jan 1857	1 00
C H Whitte, Jan 1857	1 00	T H Pinckard, Feb 1857	1 00	Dr G S Newman, Jan 1857	1 17
W W Harris, Jan 1857	1 00	Ray Graham, Jan 1860	10 00	Jno Grasty, Jan 1857	2 00
D B McGehee, Mar 1857	1 00	J M Fray, July 1852	2 00	E R Coke, Jan 1857	1 00
L A Crenshaw, Jan 1857	1 00	R B Barruss, Jan 1857	1 00	Dr T J Williams, Jan 1857	1 00
W P Waugh, Jan 1857	1 00	Dan'l Jones, Jan 1857	1 00	S Quisenberry, Jan 1858	3 00
Dr W E Dodson, Jan 1857	2 30	J B Whitehead, Jan 1857	2 00	F Jones, July 1857,	3 50
Dr T B Anderson, Jan 1857	1 00	A Phillips, Jan 1857	1 00	J Y Hardy, Apr 1856	1 50
G Moore, Jan 1857	1 00	J W Reese, July 1856	5 00	G R Trant, Jan 1857	1 00
B W Bellamy, Jan 1857	1 00	J D Massenburg, Jan 1857	1 00	W B B Walker, Jan 1856	1 25
R T Pleasants, Jan 1857	1 00	A J Greene, Apr 1857	3 00	Jos Roeky, Jan 1857	2 00
Dr R Wood, Mar 1856	3 30	R Robinson, Jan 1857	3 00	Col T J Randolph, Jan 1856	5 00
W Frazier, July 1856	1 25	S D Watkins, Jan 1857	1 00	A G Moody, Jan 1857	2 00
W F Barner, Jan 1857	1 00	Jno F Lyne, Apr 1856	2 50	K S Nelson, Jan 1857,	3 50
Sam'l A Grinter, Jan 1857	1 00	S P Mitchell, Jan 1857	1 00	Dr C D Everett, Jan 1857	8 50
J E Smith, July 1856	1 25	Maj C Yancey, Jan 1857	1 50	Mrs S J Colston, Sep 1856	3 00
L Burruss, Jan 1857	1 00	S Petty, Jan 1856	2 00	Wm Eddins, Apr 1857	1 00
A Meandon, Jan 1857	1 00	A R Stringer, July 1856	1 25	W Mason, Jan 1857	1 00
A Pointer, Jan 1858	2 00	W P Tatum, Jan 1857	1 00	R Gwathmey, Jan 1857	3 00
E Cunningham, Jan 1857	1 00	S Rixey, jr Jan 1857	1 00	W C Tucker, Jan 1857	1 00
W H Roy, Jan 1856	1 00	T Michaux, Jan 1857	1 83	H W Ashton, Jan 1857	2 50
T L Hundley, Jan 1857	1 00	Capt T Nelson, Jan 1857	1 00	R H Carter, Jan 1857	2 50
Jno W Paxton, Jan 1857	1 00	L N Davis, Jan 1857	1 00	F Ferreyhough, Jan 1857	1 00
Col Geo Townes, Jan 1861	5 00	S B Jones, Jan 1857	1 00	Jos Alsop, Jan 1857	1 00
Jno N Griffin June 1856	1 00	J M Taylor, Jan 1857	1 00	A P Rowe, Jan 1857	1 00
O C Fowler, Jan 1857	1 00	J F Greenlee, June 1856	2 50	Thos Yerby, Jan 1857	4 75
Jas D Gibson, Jan 1857	3 25	R J Davis, Jan 1857	4 00	Wm Carter, Jan 1857	2 00
Jno N Ryland, Jan 1857	1 00	Judge W Daniel, jr Jan 1857	1 00	C Morgan, March 1857	1 00
W D Blanton, Oct 1856,	1 25	T B Robertson, Jan 1857	2 25	M Wallace, Jan 1857	3 50
Jos Janney, July 1856	6 25	A W Womack, Jan 1857	1 00	A H H Bernard, Mar 1856	2 50
W Logan, Jr Jan 1857	2 00	N Piggott, Jan 1857	1 00	A P Strother, Jan 1859	5 00
Col W Rison, Jan 1857	2 50	Jno C Bell, Jan 1857	2 00	A G Binford, Jan 1857	1 00
S Gouldin, Jan 1857	2 00	R N Hudson, April 1857	1 00	R L Brown, Jan 1857	1 00
W F Lewis, Jan 1857	3 00	T J Hoduet, Jan 1857	1 00	Geo Jones, April 1856	1 35
Jno Phillips,	1 00	S C Townes, Jan 1857	2 00	E C Turner, Jan 1857	2 50
W F Hobbs, July 1857	1 00	C T Sutherland, Jan 1857	1 17	W J Webb, April 1856	1 00
W R Scarlett, Jan 1857	2 00	W Woodson, Jan 1857	1 00	W R H Garnet, Jan 1858	6 50
S Dickson, Jan 1856	2 00	R N Hudson, April 1857	1 00	Jos H Howe, April 1856	1 50
Jos Reunie, Jan 1857	3 00	W S Carter, Jan 1857	1 00	Jno Sclater, Jan 1857	1 00
S B Major, Apr 1856	1 50	W B Aston, July 1856	2 00	S T Douglass, March 1857	1 00
J P Cooke, Jan 1857	1 00	W C Rives, jr, Jan 1857	3 00	Col T Brown, January 1856	1 00
J Michaux, Jan 1857	1 00	V Markham, Jan 1857	3 75	L C Berkeley, April 1856	3 25
F B Welton, Jan 1857	1 00	R L Walker, Jan 1857	2 00	B L Cason, March 1857	1 00
		H I Opie, Sept 1856			
		A W Cousins, Jan 1857			
		W G Carrington Jan 1857			

DOUBLE SCREENED ROCKAWAY.**THE GREAT PREMIUM FAN STILL VICTORIOUS.**

Invented and Manufactured by J. MONTGOMERY & BRO., at No 155 North High Street, Baltimore. Patented Dec. 20th, 1853, and June 9th, 1855. This Fan has taken the First Premium at all the leading Agricultural Shows of Virginia, Maryland and North Carolina.

We have never been beaten since we improved our Fan, and we do not think that there is any Fan in the United States that will do its work as fast and clean as our Rockaway. They are worked easy, are very simple, can be rigged for cleaning by an intelligent farmer, are very durable, and when out of order can be repaired with great ease, by any Mechanic—and they are adapted to cleaning all kinds of grain. We have had ample opportunities to test our Fan, during the present harvest, with several of the latest improved Fans, and our experience is, that we can clean nearly, if not quite, as fast and clean, as any two of them in the same time. We think we know what the farmer wants and needs, and that our experience enables us to suit them better than any other person in the Fan business—and they may rest assured that no pains will be spared to give them the best machine in the market. Our Fan has gained its present popularity entirely in consequence of its merits—our sales have increased 50 per cent in our old districts, showing that those sold heretofore have given full satisfaction. We have sold over 550 Fans this season, and 750 will not more than supply the demand from present appearances. It is an easy matter to puff up an article before the public, through the Journals as some have been this season—but for a Fan to retain its popularity, and to increase in demand, as ours has done in the same Counties and districts for 3 and 4 years, is the best evidence of its value. Our sales are extended over six States, namely, Maryland, Virginia, North Carolina, South Carolina, Delaware and Georgia. Having secured Letters Patent for our Fan, in 1853 and 1855, we are now prepared to sell Rights for any State or County not mentioned above. We offer a good chance to any enterprising mechanic who desires to go into business—a business that can be started on a small capital and yield as fair profit as any we know of. We will give all the Patterns and any instruction requisite.

Our Fans, delivered on board the vessel in Baltimore cost \$31. All orders, by mail, as promptly attended to as if made in person.

It is deemed almost unnecessary to give certificates or references, as to the superior qualities of our Fan, as they are so universally known—but for the information of those who have not as yet used them, we subjoin the following:

CHARLES COUNTY, Md, 1855.

We have tried Montgomery & Bro's improved Double Screened Rockaway Fan, and find it to be the best we have ever seen. It cleans cleaner, faster, and works better, in general, than any we have ever tried. We recommend it to all our friends. JOHN WISE, JAM'L CARRINGTON JOSEPH YOUNG, JOS. H. COOKSEY.

This is to certify that I purchased of Messrs J. Montgomery & Brother, one of their wheat Fans, the 17th of July, 1852, and I consider it an excellent fan. It is now mowing wheat this day, and I think it is as perfect as when I first purchased it, except the usual wear and tear. I would recommend them to the public. DAN'L NEWNAM.

ROCKFIELD, NELSON CO., July 23d 1855.

Messrs. J. Montgomery & Bro:

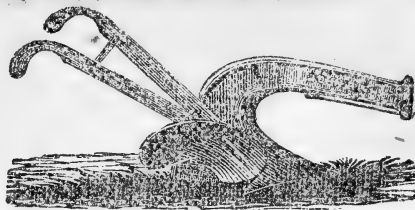
I am more than pleased with your Rockaway Fan; had obtained yours in time on my last year's third and inferior qualified wheat, (the remnant) I could have saved \$150.

H. N. COLEMAN, SR.

All orders addressed to the undersigned, at Baltimore City (Md.) Post office, will be promptly attended to.

J. MONTGOMERY & BRO.,

55 N High St., bet Hillen and Gay, Balto. April 1856.

**AGRICULTURAL WAREHOUSE.**

The Subscribers are prepared to receive Orders for all kinds of Agricultural Machines and Implements of the latest and most approved patterns, which will be made of the best materials and of superior workmanship. They ask attention to "Cardwell's Double and Single Geared Horse Powers and Threshers," which have taken a Premium at every Fair at which they have been exhibited. Also, to "Croskill's Clod Crusher;" "Manny's Patent Reaper and Mower," the best in use; Fawke's Patent Lime and Guano Spreader, highly approved; Whitman's Corn Planter, a superior machine; Rich's Patent Iron beam Plow, of various sizes, &c. They subjoin the opinion of the Hon. Wm. C. Rives of these Plows.

BALDWIN, CARDWELL & CO.

Richmond, February 27th.

CASTLE HILL, Dec. 15, 1854.

COL. WM. B. STOUGHTON:—Dear Sir: I take pleasure in recording here my impressions of the performance of your Plow (Rich's Iron-beam Patent) at Cobham to day. The work was far more thorough and complete than that of any plow I ever saw in operation before. The furrow opened by it was very generally 13 inches deep and about 20 inches wide in hard close land, and most effectually and perfectly cleaned out, none of the sod earth falling back into it.

The trial of the plow was witnessed by many of my neighbors, among whom I will mention Messrs. Frank K. Nelson, J. H. Genell, J. H. Lewis, C. B. Hopkins, Thomas Watson, of Louisa, &c., all practical men and most excellent judges of agricultural implements, and there was but one opinion among them as to the superiority and unexceptionable performance of your plow.

Wishing you equal success elsewhere in making this valuable implement favorably known to our agricultural brethren, I remain yours, truly,
ap 1t WM. C. RIVES.

OUR CATALOGUE OF AGRICULTURAL BOOKS,

COMPRISING SEVENTY-FIVE DIFFERENT BOOKS ON AGRICULTURE,

Will be sent postage free to all who will favor us with their name and address.

Among the books recently published by us are:

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CRANBERRY CULTURE. 50c.

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ELLIOT'S AMERICAN FRUIT-GROWER'S GUIDE.

\$1 25.

THE STABLE BOOK. \$1.

BOUSSINGAULT'S RURAL ECONOMY. \$1 25.

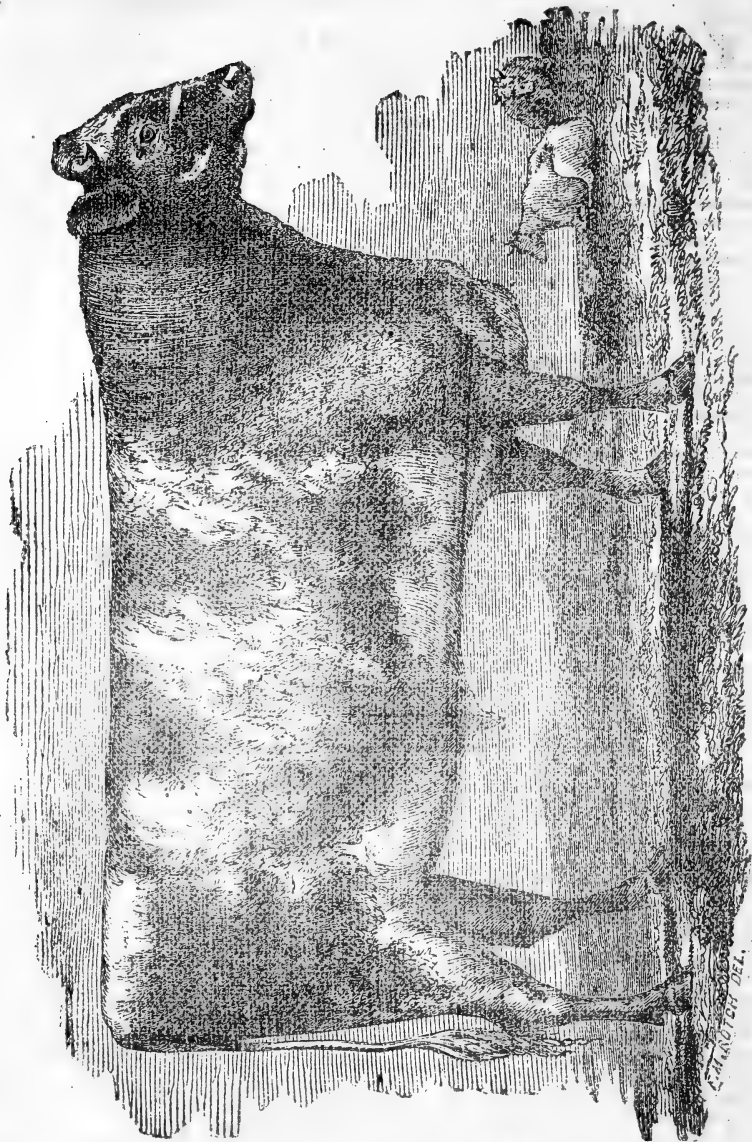
THOMPSON ON FOOD OF ANIMALS. 75c.

PRACTICAL LAND DRAINER. 50c.

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C. M. SAXTON & CO.,
Agricultural Book Publishers,
No. 140 Fulton St., N. Y.

ap-1t



PRINCE GEORGE OF CAMBRIDGE.

PROPERTY OF F. M. HATCH.

THE SOUTHERN PLANTER.

No. 4.

ADVERTISING SHEET.

APRIL, 1856

EDITH ALLEN,

OR, SKETCHES OF LIFE IN VIRGINIA, BY LAURENCE NEVILLE.—\$1.

"This is a new novel, from the pen of a Virginian whose *nomme de plume* is LAURENCE NEVILLE. The plan of the writer is most successful, and with some qualification it may be pronounced one of the very best novels of the day. The writer devotes himself with a little too much pertinacity to the portraiture of social life, and therefore the story is somewhat overloaded. This defect is pardonable, and detracts but little from the interest of the book, which is characterised by decided talent, and whose portraictures show that they are drawn by the hand of a man of genius. We commend it to all lovers of fiction.

"A most interesting fact concerning this book is, that it is not only issued under the auspices of a Virginia publisher, but is really printed and bound in Virginia. J. W. RANDOLPH is the publisher, and CHAS. H. WYNNE of this city is the printer. The letter press of this book is not surpassed by that of any novel of the day. It is admirable, and reflects the highest credit upon the typographical art in Virginia. In the present juncture of our national affairs, this additional proof of the ability of the South to do its own printing, is peculiarly gratifying."—*Richmond Dispatch*.

VIRGINIA CONVENTION 1776.

A DISCOURSE

Delivered before the Virginia Alpha of the Phi Beta Kappa Society, Williamsburg, by
HUGH BLAIR GRIGSBY.

This is not only a history of the Convention of 1776, but the most detailed and connected account in print of the lives and characters of the men who composed it, including Robert Carter Nicholas, Richard Bland, Archibald Cary, Edmund Pendleton, John Blair, Henry Tazewell, Patrick Henry, Richard Henry Lee, Thomas Read, Thomas Lewis, William Cabell of Union Hill, Thomas Jefferson, James Madison, George Mason, and others.

One handsome volume, 8vo, of over 200 pages—\$1 50.

PLANTATION BOOK.

THE PLANTATION AND FARM INSTRUCTION, REGULATION, RECORD
INVENTORY AND ACCOUNT BOOK,

For the use of Managers of Estates and for the better ordering and Management of Plantation
and Farm Business in every particular, by a SOUTHERN PLANTER.—\$2.

This book is by one of the best and most systematic farmers in Virginia, and experienced farmers have expressed the opinion that those who use it will save hundreds of dollars.

Notice from the American Farmer.

"This is a most admirable work, one which every planter and farmer should not only possess but carry out its objects and aims, both in the letter and in the spirit, for they all tend to the introduction of system in the management of landed estates. The Book purports to have been gotten up as a guide to overseers and managers; but is so filled, so arranged, that the proprietors of such estates would themselves be equally benefited by personally carrying out its numerous plans, hints and suggestions; for after carefully looking through and studying its details, we most conscientiously say, that they are founded in wisdom, and, if practised upon, would be promotive alike of economy and humanity—economy in the management of the farm or plantation—and humanity in providing for the health and comfort of slaves, as well as stock."

Books sent by mail post paid, to all who remit the price. Catalogues given to all who apply.

New works of merit received, as soon as published.

All kinds of Stationery of the best quality.

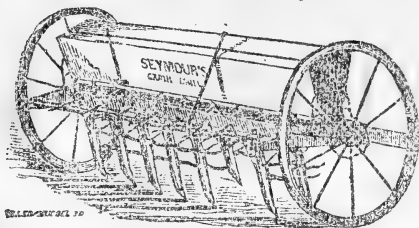
Blank books of home manufacture always on hand and made to order.

Books bound in muslin, paper, sheep, calf, Morocco, turkey, yellow cloth, velvet, parchment and Russia, in every style of plain and ornamental finish.

Books published and all kinds of Printing executed with neatness and dispatch.

J. W. RANDOLPH,
121 MAIN STREET, RICHMOND, VA.

SEYMOUR'S IMPROVED PATENT GRAIN DRILL,



THIS Machine is capable of sowing all coarse grain and all fine seed commonly sown by Farmers, from corn and peas down to the smallest seed, such as clover, timothy and other grass seeds, either broadcast or in Drills, and while it is the best Drill for wheat, rye, oats, barley, &c., it is just the thing to drill in fine dry fertilizers before putting in the seed—or, these fertilizers may be mixed with the seed, and all deposited in the ground together.

Its reputation has been in advance of all other drills for the last six years, in the State of New York, and it has six times taken the first prize bestowed on Grain Drills by the Agricultural Society of that State, including the highest prize and diploma, at the great trial of implements made by that Society at Geneva, in 1852. It is one of the most simple in its construction and machinery, as well as the most convenient and durable of all Drills; and without disparaging others, it is believed to be better adapted to the various purposes for which such a machine is wanted, than any other implement known in America; and its value is greatly increased from the fact that it is converted into a Broadcast Sowing Machine, merely by removing the drill teeth and conducting tubes, which can easily be done in five minutes. A recent improvement which prevents the shrinking and swelling of the wood from affecting the correctness of its operation, also adds much to its value.

Another and still more recent improvement, called

SEYMOUR'S GUANO ATTACHMENT

Is expressly intended to meet the wants of those who wish to drill fine fertilizers into the ground with the grain, but prefer to keep such fertilizers in separate compartments till discharged from the box, when both seed and fertilizers will pass together through the same drill tubes into the ground. There is therefore but little room for those who are well posted in relation to grain drills, to doubt that this is the cheapest, as well as the

BEST GRAIN DRILL IN THE WORLD!

They are usually made with nine teeth, eight inches apart. The wheels are high, and the draught so light for a team, that those with only seven teeth are now seldom ordered, while there is an increasing demand for those with eleven teeth; therefore those with nine and eleven teeth are the only sizes kept on hand—but any other size, and those with teeth any other distance apart, will be made to order.

The Machinery is remarkably simple, permanent and easily kept in repair; and all the parts are so clearly presented to the view of the operator, that he can readily see if anything is not correct; and the grain falls from the seed box to the tubes (a space of several inches,) in full view, so that in passing over a field, he may be constantly assured that the seed is deposited as designed.

The teeth are all placed in one rank, unless ordered to be put in two ranks. It is believed by those who have made experiments, and given the subject their careful attention, that the evils caused by lumps, stones, &c., being thrown by the teeth in the hind rank into the furrows made by the teeth in the front rank, are in most cases far greater than the advantages gained. This fact has induced the inventor to construct his double-ranked drill so that the teeth can all be placed in one rank, at pleasure, thus obviating in this drill the objection to all other two-ranked drills. The price of the drill with teeth in two ranks, is five dollars higher than those with teeth in but one rank.

If required to sow Plaster, Guano, or any other fertilizer, a Feeder should be added, for these are very apt to be damp and if slightly damp, the Feeder is useful.

If required to sow grass seed, WHILE DRILLING, a light broadcast "seeder" is added, with which any seed, from wheat to the smallest seed, can be sown in front of the drill teeth, and is slightly covered by them. Clover and Timothy mixed is readily sown with this, and it is conveniently gauged to any desired quantity per acre. To convert it into a Horse Hoe, for hoeing drilled grain, a set of Horse Hoes, with shanks, like the shank of the drill teeth, are put in place of the drill teeth. With these additions or "Extras," it is capable of sowing grass seed, hoeing drilled grain, and sowing plaster, ALL AT ONCE. The machines are designated by number as follows:

No. 1,	9-tooth,	-	-	-	\$90 00
No. 2,	do.	with Feeder,	-	-	96 00
No. 3,	do.	do. and Grass Seeder,	111	00	
No. 4,	11-tooth,	-	-	-	100 00
No. 5,	11-tooth, with Feeder,	-	-	-	106 00
No. 6,	do.	do. and Grass Seeder,	121	00	
No. 7,	9-tooth, with Guano Attachment,	110	00		
No. 8,	do.	do. and Grass Seeder,	120	00	

They are made under the superintendence of the patentee and inventor, and we design to make every machine in all respects as it should be, believing it will contribute to our own interest so to do, and that if we put in bad work or poor materials, the injury falls heavier upon ourselves than it can upon the purchaser.

We omit hundreds of certificates and recommendations of the most encouraging nature from the most reliable sources; and for reference will only add the names of the following most reliable gentlemen:

Isaac Newton,	Philadelphia, Pa
Wm. Hadley,	Dansville, N. Y
A. Griswold,	do.
E. C. Patterson,	Portage, N. Y.
H. Howard,	Lavonia, N. Y.
P. P. Barnard,	Richmond, N. Y.
H. G. Hall,	do.
Welford, Eastham & Co.,	Fredericksburg, Va.
Rob't W. Carter,	do.
Rowlette & Hardy,	Petersburg, Va.
Thos. Branch & Sons,	do.
D. D. T. Moore, Ed. Rural New Yorker,	Rochester.
H. Munson, Pres. of two Ag. Soc.,	E. Bloomfield, N. Y.
E. M. Bradley, Sec. two Ag Soc.,	do.
Ira Peck, Pres't Town Ag. Soc.,	do.
T. H. Kellogg, Jr., Sec. Town Ag. Soc.,	do.
Guy Collins,	do.
N. Steel,	do.*
M. Adams,	do.
Dea. Pomeroy,	do.
Luther Munson,	do.
G. North,	do.
H. W. Hamlin,	do.

Moses Eggleston,.....	E. Bloomfield, N. Y.
Hiram Steel,.....	do.
Wm. Carter,.....	do.
F. N. Toby,.....	do.
Ten Eyck Munson,.....	do.
J. W. Taylor,.....	do.
Ford. Beebe,.....	do.
Frank Beebe,.....	do.
Rufus Humphrey,.....	Victor, N. Y.
M. Norton,.....	do.
Levi Boughton,.....	do.
Wm. Boughton,.....	do.
J. C. Culbertson,.....	Genesee.
Hon. T. C. Peters,.....	Darien.
Calvin Sperry,.....	Gates.
A. Van Bergen, Pres't N.Y. State Ag. Society, Coxsackie.	
Hon. C. H. Carroll,.....	Groveland.
L. Bradner, Pres't Bank of.....	Dansville.
H. Keeler,.....	S. Salem.
W. B. Bowerman,.....	Scottsville.
J. A. Gillis,.....	Farmington.
J. Lattaurette,.....	Waulden.
S. Howard, Ed. Cultivator,.....	Boston.
Rev. C. Cory,.....	Iima, Ia.
E. S. Gilbert,.....	Moline, Ill.
H. Pitts,.....	do.
Hon. D. R. Burt,.....	Potosi, Wis.
A. S. Lenoir,.....	Louden, Tenn.
Col. Castle,.....	Cheshire.
F. W. Fenner,.....	Camillus.
S. F. Norton,.....	Springwater.
P. R. Adams,.....	Tecumseh, Mich.
E. Boughton,.....	Battle Creek, do.
D. B. & G. C. Burham,.....	do. do.
Linus Cone,.....	Troy, do.
F. Bradley,.....	Waterford, do.
C. B. Seymour,.....	Scio, do.
S. G. Patterson,.....	Marengo, do.
G. Dryer,.....	do. do.

Printed directions for using accompany each Machine. Those who desire further information will please address the inventor, P. Seymour, or the subscriber, at East Bloomfield, Ontario Co., New York.

C. H. SEYMOUR.

East Bloomfield, Ontario Co., N.Y., 1856; feb'1

DANIEL H. LONDON,

Corner Main and 13th streets,

IMPORTER,

KEEPS always for sale the best Negro Clothing of English and domestic makers AT THE LOWEST PRICES. The farmers and planters will find it to their interest to examine his stock. Silk carpets, blankets and of all kinds of seasonable goods, for sale in quantities to suit the buyer. au if

PERUVIAN GUANO.

WE are now receiving our Spring Supply of Guano. We were unable to buy any in first hands, delivered in Baltimore, and had therefore to take New York Guano, without any inspection or analysis. Our purchases, however, were made direct from the Agents, Messrs. Braneda & Brother, and the Guano delivered to our vessels, on their order upon their warehouses in New York, in good order. All of it will be inspected here.

We will be pleased to have orders at the present price, or will make engagements at the current Market Price at the time the Guano is delivered, as our friends prefer.

CRENSHAW & CO.,

North Side of the Basin,
Richmond, Va.

March 1, 1856.

THE CHINCHA ISLANDS.

AS many ships to our address are under charter to proceed to those Islands to load Guano, we beg to submit some particulars relative to the detention of ships and the expenses of Loading.

All vessels may expect to lay out the full number of those lay days before loading is completed. A bonus of \$10 to \$15 per day, for every day saved, is sometimes paid as a gratification to officials. Most ships are kept a month after arrival, before an order is given to ballast, after which it is decided whether they are to load by lighter or by "Manguera," or shoot, by which the Guano is ran into the hold.

The "Manguera" discharges from 400 to 500 tons per day. All ships dry up very much, from being exposed to a hot sun, and nearly all are obliged to caulk before leaving, unless they have been very recently caulked. Vessels should be provided with oakum and pitch, and English Caulkers can be obtained at \$4 per day and board. American coin or Sovereigns are best for disbursements—the former passing at par, and the latter at \$5 each. Captains of vessels, short of funds, can obtain money of resident Houses, if well accredited, at 6 per cent. premium upon sight bills, or draw upon their charters at 12 per cent. premium. The following were the Port Charges and disbursements for a ship of 700 tons:

CALLEO.—Stamps, \$5; Sailing License, \$11.....	\$16 00
Tonage Dues, 25c per ton.....	175 00
Clearance dues, Pisco.....	4 00
Com'n on Charter.....	150 00

At the Islands..... 345 00

Manuquera Fees, mooring.....	\$20 00
Pilot attending.....	24 00
Trim'm'g Fees, 17c reg'r ton.....	119 00

163 00

Crew to load from Callao and

back, 16 men 3 months each,

at \$20 per month..... 960 00

Com'n shipping and boat hire,

\$2 each..... 32 00

Market bill for beef and vegeta-

bles, 3 months..... 300 00

Water bill for the Islands..... 50 00

Crew shipped to go home, 16

at \$36 per month, 2 months

in advance, \$70 each, is..... 1,120 00

Com'n ship'g and boat hire, \$5

each..... 80 00

Water to go home..... 30 00

Captain's expenses at Calao &

Lima..... 25 00

2,597 00

Add for caulking ship..... 200 00

" gratification to trimmers and

pilots..... 30 00

\$3,335 00

There is another charge for hire of water casks (2 cents per gallon) to carry water from Calao to the Islands, which the charter says is to be delivered "free of expense." The water has to be bought, and if the ship has no spare casks, they have to be hired. There is also a chance of losing \$50 on the boats or lighters used in ballasting or loading, vessels arriving purchasing of those leaving and when loaded, but not always obtaining as much as they expected. se—tf

HUSSEY, BOND & HALE.

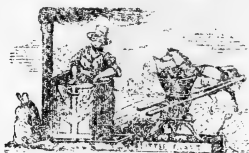
GENERAL AGENCY AND COMMISSION BUSINESS.—The subscriber tenders his thanks for the many calls heretofore received, and again offers his services on reasonable terms. Now for sale many farms in Maryland and Virginia, Stallions, Bulls, Bucks, Bears, of improved stock; improved fowls of all kinds; Mares, Cows, Ewes, Sows; Ewes one-half and three-fourths Cotswold; Calves at three months old, one-half Alderney; South Down Ewes with their lambs. For particulars address (post paid) the subscriber.

MARTIN GOLDSBOROUGH,

38 Holliday Street, Baltimore, Maryland.

P. S.—Answers to letters particularly desired. M. G. may—f

THE LITTLE GIANT
FAR IN THE LEAD OF ALL
COMPETITION.



SCOTT'S PATENT LITTLE GIANT
CORN AND COB MILL

Has undergone a trial and test for nineteen months and better, and testimony is daily coming in from innumerable witnesses speaking from experience, and confirming what the public press has already said in its behalf, proving that after a constant use for the above period of time, IT EXHIBITS NO PERCEPTIBLE APPEARANCE OF WEAR. In view of these facts we are prepared to say to our friends and customers generally, that we will give them a full and unqualified guarantee, and as a proof of our earnestness in the matter, we ask permission to give you one upon trial, and if you are not perfectly satisfied after thirty days use of the same that it is far superior to, and will last much longer than any other Mill for a like purpose now in use, you are at liberty to return it and the money will be refunded without one cent of discount or deduction.

The particular properties and qualities of the Little Giant, which place it far in the lead of all competitors, have been claimed for some of the latter in a sort of quack nostrum advertisement, upon the principle, we suppose, that it is quite as proper to trade on borrowed merit as on borrowed capital. The same advertisement has stated that *Cast Iron Mills* for grinding Corn and Cob will not last more than two years, and that the cost for keeping them in repair for ten years will be equal to four times their original cost. Very possibly this may be the case with some *Cast Iron Mills*, but it certainly is not so with the *Little Giant*, as the following facts will make apparent to every reader of ordinary intelligence.

Mr. Scott the patentee has secured by *letters patent* a double set of arms in the top of the mill (or what he terms a driver and arms,) for the purpose of more effectually pulverising the Cob and preparing it for the centre of the Mill, which very materially lessens the strain on both Mill and team. In the common Mills now in use—such for instance as we find in borrowed plumage in advertisements—this double set of arms, or driver, cannot be used without a direct infringement upon Scott's Patent, consequently the strain is so very great upon the periphery and fine grinding surface of the Mill, that it will last but a very short time and necessarily requires a ring (or some additional part) to keep them in working order; and if they require one ring which is upon the shell of the Mill, they will just as surely require another upon the cone (or burr) which is more liable to wear out than the shell.

Again, in some of these common mills the legs are made very slight and cast fast to the Mill; in the event of a leg being broken, it requires an entire new shell to replace it, which will be one half the price of a new Mill. Not so however with the Little Giant. Mr. Scott has also secured by *letters patent* what he terms a pocket on the side of the shell of the Mill, so that in the event of a leg being broken either by accident or design, it can be im-

mediately replaced by the most ordinary farm hand and at a very trifling cost; hence we are prepared to prove beyond all controversy, that the expense to run the Little Giant for ten years will not be as much for repairs by one half as any other Mill now in use, from the fact of the simplicity attending any repairs that it might require, added to the durable properties of its inner arrangement with its double set of arms and immense grinding surface. The amount of work it can do with a comparatively small power, the superiority of its work when done, and its capability of being managed by the most unskilful farm hand, places the Little Giant a head and shoulders above any similar invention, and entitles it to be recognized as the *Goliath* among Corn and Cob Mills. Conductors of public journals who have seen it in operation by the side of others, and all farmers who have had it in use for any time, proclaim it to be the only effective and reliable Mill for grinding Corn and Cob ever invented. At a time like this when the products of our farms and fields command a high price, and when it is important that the farmers should save as much grain as possible for the markets of the country, no one engaged at farming, or who may have stock to feed, should be without one of these Mills a single week. A trial is all that is necessary to show that it possesses advantages over all other similar Mills now in use; and to commend it to universal favor.

Manufactured and for sale by

ROBBINS & BIBB,

Warehouse 39 Light street, Baltimore, Maryland

or by

THOMAS BRANCH & SONS,

and

ROULETT & HARDY,

PETERSBURG, VA.

CERTIFICATE.

PHILADELPHIA, December 13, 1855.

Messrs SANDS & WORTHINGTON,
AMERICAN FARMER,—Baltimore, Md.

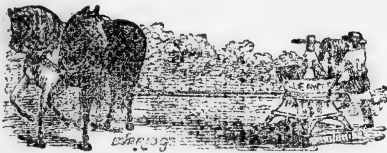
Gentlemen:—

We notice in the columns of your very valuable paper, an *interested* one sided statement of the Trial of Corn and Cob Mills at the late Fair of the Maryland Agricultural Society, and thinking it hardly fair that the impressions which are intended to be conveyed by the author of the advertisement, should go broad cast to the entire farming community without some comment, we have taken it upon ourselves to give what we deem and what dozens of disinterested persons will bear us out in asserting to be a fair and disinterested statement of that trial, and we call upon the examining Committee, Messrs. M. T. Goldsborough, and E. B. Calbert to confirm our statement. The first thing that drew our attention to the trial was the appearance of the gentlemen (committee) at the location of the Excelsior or Leavitt's Mill (which we must admit ground very prettily) having two horses attached; the committee then went to the Scott's Little Giant (or Messrs. Robinson & Bibb's Mill) which required one minute and a quarter longer to produce the same amount of meal some one present that the trial was hardly fair with but one horse. The remark was then made by inasmuch as the Excelsior was grinding green corn with two horses, and the Little Giant was grinding hard flinty corn with but one horse: the committee having satisfied themselves of that fact, requested Mr. Leavitt to try the hard corn, which was assented to, and the hard corn put in, and at the second

revolution the sweeps flew all to pieces, the corn being entirely too hard for it. This induced the committee to postpone their examination until the next morning, with the request that each Mill should be tried with the same corn. Then came the trial referred to, and feeling some curiosity in the matter we made our appearance upon the ground in good time to witness it. The commencement was with Mr. Maynard's Champion Mill which produced a half bushel measure half full of meal in five minutes, requiring twenty revolutions with but one horse. Then came the Excelsior, which produced about the same amount of meal in three minutes and a quarter, requiring 10 revolutions with two horses. Then came the Little Giant, which produced about the same quantity in four minutes, requiring fifteen revolutions with but one horse. Then came Mr. Colburn's Mill, which produced the same amount of meal in eight and a quarter minutes, requiring thirty-two revolutions also with one horse. We were under the impression that the Little Giant led the van, but there is the statement and a disinterested community can judge for themselves.

Jan 11

EDMUND MAHER.



**C. LEAVITT'S PATENT EXCELSIOR
CORN AND COB CRUSHER,
YOUNG AMERICA!
A WESTERN INVENTION.**

THE above cut represents a valuable improvement in Portable Grain Mills, which are now required and found so profitable in the improved modes of feeding stock. It is well known in the Western States, that the Farmers of this country are indebted to Mr. Charles Leavitt, of Quincy, Ill., for the successful introduction of a machine for grinding Corn and Cob. Machines for this purpose have long been in use, but were attended with too much labor and expense to render them profitable.

In the year 1852, after expending much time and money, he invented and patented a machine for this purpose, which has proved almost invaluable to the farmer; and since the great success of this invention, various machines have been introduced into our markets, such as the "Star Mill," "Little Giant," &c. &c., for the same purpose. Mr. Leavitt being the original inventor of this kind of machine, and from a long experience, finding that all of them had some defect, he again went to work to improve the defective parts; and in February, 1855, he patented another Mill, which has proved to be far superior to them all. It was fairly tested at the Ohio State Fair in October, 1855, with the "Little Giant," "Star Mill" and others, and was awarded the highest Premium, and is pronounced far superior to all others. This Mill is set on three legs, cast solid to the inner Plate or Cone of the Mill, which is considered proof against breaking by the draft of the horses, thus making the inside Grinder stationary while the concave or outer Grinder revolves, by means of a double lever which applies the power directly where required, with the least possible loss by friction.

The large teeth or cob breakers are set as near the centre of the Mill as possible. The fine teeth

are inserted on moveable rings, which can be cast thin of hard metal, and if ever worn out can be readily replaced by new ones in five minutes time, at a trifling expense compared with the cost of pecking stones.

This Mill is furnished with two sets of fine teeth, (and others can be furnished at anytime at a cost not exceeding three dollars per set,) one set for Crushing and Cob Grinding, and the other for Grinding fine Meal for family use.

This Mill has also a very simple and convenient arrangement for receiving and conducting the Meal out at a spout on one side of the Mill, which will enable the operator to set a box under and receive the Meal without the trouble of shoveling it up.

The adjusting apparatus is simple and effectual and is worked from above without interfering with the operation of the Mill; by it the Mill is made capable of application to a vast range of purposes, as well as being made to grind coarse or fine as desired.

Among the uses to which this Mill is adapted are the following, viz: Grinding or Crushing Corn and Cob together, Grinding Meal from Corn and other Grain, and other like purposes.

This form of Mill is so simple in its construction, and so few in its parts, that it can be furnished at a very low price, when the value of the services it performs is considered; and for the same reason it is durable and not likely to get out of repair.

It is a well known fact among Scientific Farmers, that two bushels of Corn ground is worth three in the ear, to feed hogs or cattle, and will fatten either in one third less time.

Price \$50—including an extra set of Grinding Plates, which renders it equal to two entire Mills for \$50, and new Plates can be furnished at the small cost of \$3 per set, which can be attached in the same manner that new points or shares are put to a Plough when the old ones are worn out.

Trial of Corn and Cob Mills, at the late Fair of the Maryland Agricultural Society.

The following table will show the time occupied and number of Revolutions of each of the Mills on Exhibition, in grinding half bushel of Corn and Cobs.

Excelsior Mill.....	2½ Minutes...	10 Revolutions.
Little Giant Mill.....	4½ " ..	15 "
Maynard's Champion Mill, 5 "	..	20 "
Colburn's Mill.....	7½ " ..	32 "

Advantages of the Excelsior Mill over all others:—

1st. Great Strength and Durability. 2d. Simplicity—having only one set screw to graduate the quality of grinding, which renders it so simple that it may be managed by any ordinary farm hand. 3d. It will grind more Corn, or Corn and Cob, in the same time, and of same quality, than any other Mill in use. 5th. Economy— that part of the mill which is most liable to wear being separate from the main body of the machine can be renewed, when worn out, at the small cost of \$3. Thus, in the Excelsior Mill we present the Best, Cheapest and most durable Mill ever offered to the Farmer.

The above Mills are now manufactured and for sale by TALBOT & BRO. Shockoe Foundry, Cor. 19 and Carey sts. Richmond, Va.

All orders punctually attended to, and circular and further information furnished by

R. McLAGAN.

dec1—101

157 Main Street, Richmond, Va.

GREAT REDUCTION IN PRICES OF HATS AND BOOTS.—J. H. ANTHONY'S FASHIONABLE HAT STORE, Columbian Hotel Corner. The cheapest place in the city of Richmond to buy hats and boots is at the above store, where every article sold may be relied on as represented. By this means he has gained a good run of custom, and his customers are satisfied. Below is a list of his prices, which will be strictly adhered to:

Best quality moleskin.....\$3 50
 Second quality moleskin..... 3 00
 Best quality silk..... 2 50
 Second quality silk..... 2 00
 Fine Calfskin Sewed Boots only three dollars and fifty cents.

Also, Caps, Shoes and Umbrellas.

J. H. Anthony has made an arrangement with one of the best makers in the city of Philadelphia to supply him with a handsome and substantial calfskin sewed Boot, which he will sell at the unprecedented low price of three dollars and fifty cents. The attention of gentlemen is respectfully solicited, as they are the best and cheapest boots that have ever been offered for sale in this city. He intends to keep but the one kind, and sell them at one price.

mar'54—tf

SINTON & SONS' NURSERY,

Near Richmond, Va.

As the season for planting has arrived, the subscribers would respectfully call the attention of their friends and the public generally, to their large and extensive collection of FRUIT TREES, embracing, perhaps, a selection that has not been surpassed, for the climate of Virginia, and nearly all propagated from fruit-bearing trees in their own orchard.

Catalogues, with directions for planting, may be had at William Palmer's Seed and Plough Store; at Peyton Johnston & Brother's Apothecary Store; at C. J. Sinton & Co's. Hardware Store, and at Logan Waller's Commission House, where any orders left will be punctually attended to, and letters addressed to the subscribers, Richmond, will receive prompt attention.

nov—tf

JOSEPH SINTON & SONS.

SCHOOL FOR BOYS.

THE second session of my school will begin the first October next and terminate the first of August following. I desire to get as boarders in my family, two boys, about twelve years old. The school is a small one, intended for the education of my own children, and the course of instruction such as will fit them for the University of Virginia.

TERMS—Two hundred dollars for the whole session; payable one half the first October, the other half the first of March.

FRANK G. RUFFIN,

Summer Hill, Chesterfield,
4 miles below Richmond.

DOMESTIC ANIMALS AT PRIVATE SALE.

L. G. MORRIS' Illustrated Catalogue, with prices attached of Short Horned and Devon Bulls and Bull Calves, a few Horses, Southdown Rams, Berkshire, Suffolk and Essex Swine, will be forwarded by mail, if desired, by addressing L. G. MORRIS, Fordham, Westchester County, N. Y., or N. J. Becar, 187 Broadway, N. Y. It also contains portrait, pedigree and performance on the turf of the celebrated horse "Monarch," standing this season at the Herdsdale Farm.

je—tf

SOUTHERN CLOTHING HOUSE, AT RICHMOND, VA.

THE Subscriber keeps constantly on hand a large and Fashionable Assortment of Ready made Clothing, of his own manufacture, of the latest and most approved Styles. Also a large assortment of Gentlemen's furnishing Goods, such as HANDKERCHIEFS, Cravats, Neck Ties, Shirts, Drawers, Gloves, Suspenders, Collars, Umbrellas, &c. &c.

In addition to which he keeps a large and general assortment of Piece Goods of every Style and Quality, which he is prepared to make to measure at the shortest notice and in the best and most fashionable style.

E. B. SPENCE,

mayly

No. 120, Corner of Main & 13th sts.

THREE TRACTS OF LAND

On the Danville Railroad in Amelia, 36 miles from Richmond, for sale.

I have for sale three tracts of land in Amelia County. One, the tract on which I reside, containing 310 acres, with excellent Dwelling, 7 rooms, newly painted, and in excellent order, with all necessary outhouses, above two thirds cleared, the other in timber. One other tract, 150 acres with a new house, 3 rooms, and a large passage; about the same proportion of cleared land as the above. Another tract, 760 acres, with all the necessary out houses, including a first rate granary, 8 tobacco barns, an overseer's house, with four rooms, with five servant's houses, all new with brick chimneys; the granary well painted. Each tract is good tobacco and wheat land, the largest tract thought to be among the best if not the best quality of soil in this part of Virginia, with one hundred acres of first rate Creek and Branch low grounds. This tract is within two miles of Amelia Ct. House Depot; the other tracts, one three the other four miles from said Depot. I wish only to sell two of the above tracts, reserving one for myself, purchasers however having choice of the three.

Price and terms will be reasonable, as I am determined to sell. For any further particulars address me at Amelia Court House Post Office.

jan1f

JOHN G. JEFFERSON.

INFORMATION FOR THE PEOPLE.

To be sold, fifty thousand, will be published about the first of March, Price fifty cents, Three Copies for One Dollar.

A NEW MAP OF VIRGINIA.

Upon which are delineated its vast Works of Internal Improvements, and all information usually found on Maps of the later dates; accompanied with a Pamphlet containing a register of the various Officers of the Commonwealth, Members of Congress, House of Delegates, &c., &c. Also the CONSTITUTION OF VIRGINIA, AND THE BILL OF RIGHTS.

With a vast amount of valuable information indispensable to every citizen of the Commonwealth.

Published by **RICHARD EDWARDS**, No. 157 Main Street, Richmond, Va.

Persons wishing a Copy of the New Map, will please forward their orders without delay, so as to secure a first impression. Send Post Office Stamps instead of Silver change; a gold dollar can be inclosed to any part of the country.

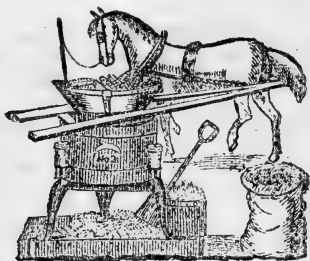
Orders can be sent direct to the Publisher,

RICHARD EDWARDS,

Richmond, Va.

Or **THOMAS BAILIE**, Planter Office, Richmond, Va., and Copies will be forwarded at once.

fe1f



**ROBBINS & BIBB, PROPRIETORS OF
THE BALTIMORE STOVE HOUSE,
AND MANUFACTURERS OF
SCOTT'S PATENT LITTLE GIANT
CORN AND COB MILL,**

Patented May 16th, 1854—Copyright secured March 1st, 1855.

NOTICE.—LITTLE GIANT—Any infringement of the patent of the Little Giant Corn and Cob Crusher, either by selling into our territory, or attempting to infringe the patent, will be prosecuted to the utmost extent of the law.

ROBBINS & BIBB,
Light street near Pratt—Baltimore.

Town and County Rights For Sale.

LITTLE GIANT—The subscribers having secured the right from Lyman Scott to manufacture and sell the Corn and Cob Mill, known as the Little Giant, are now prepared to execute promptly, in a thorough workmanlike manner, all orders, whole sale and retail, of said Mills. The reputation won by these Mills for the past year throughout the United States, is a sufficient guarantee of its utility and established character. It has cost a large amount of money and labor to bring the Mill to its present state of perfection, and is now offered to the Planters, Stock Feeders and others as a complete article of mechanism, simple and practical in use, durable in construction. It is pronounced by every body to be the most important article of the kind now in use, not only well adapted for grinding cob meal for stock, but grits or fine hominy for the table, &c., &c. The Little Giant received the first premium at the late Agricultural Fairs of Missouri, Kentucky, Maryland and other States, and that in the most complimentary manner. These Mills are guaranteed in every respect, and No. 2 Mills warranted to grind ten bushels of feed per hour with one horse, and offered at the low price of \$44, all complete, ready for attaching the horse. No. 3 Mill, at \$55, grinds fifteen bushels per hour, and No. 4, at \$66, grinds twenty bushels per hour with two horses.

[Extract from a Western Paper.]

**THE LITTLE GIANT
PATENT CORN AND COB MILL.**

We would call the attention of the farming community, or those who have stock to feed or fatten, to the above mill, confident that all who consult economy and practice good husbandry, will avail themselves of the use of an implement, the merits of which have been tested by leading Agriculturists throughout the Union. "The Little Giant" quoth one of our townsmen, "is no Yankee tool but begotten in the South-west, at St. Louis, Missouri, born and bred in the biggest corn field of the big-

gest corn, of the great American bottom—hence its natural proclivity and rapacity to chew up ear corn and to do things wholesale after the western fashion." We notice in the Agricultural papers from that quarter, and all along shore, that the Little Giant has ground its way from the Mississippi to the Atlantic, taking the first premiums at State and County Fairs and Mechanic's Institutes of Missouri, Illinois, Indiana, Kentucky, Ohio, Pennsylvania, Carolina, Virginia, Georgia, New Jersey and Maryland; and has now got right among the down easters, masticating the hard flinty corn of that country to their infinite delight and satisfaction.

An Agricultural Improvement of the South-west, that the invention and skill of the East acknowledges superior to any thing of the kind got up, and is sought after by the intelligent discerning farmers of that region, must have substantial merits. Indeed, to commend itself to those who are so well qualified to judge, who from their circumstances and education, are led, if not compelled, to practice an economy in all the operations of the farm, which would appear with us to amount almost to stinginess, must combine advantages that adapts it in the highest degree to meet the purposes intended.

Messrs. ROBBINS & BIBB, of the Baltimore Stove House, 39 Light street, we understand have the patent right for some ten or a dozen States.

BLENNHEIM, NEAR CARTER'S BRIDGE P. O., }
Albemarle Co., Va., Oct. 5, 1855. }

Messrs. Robbins & Bibb, Baltimore.

GENTLEMEN:—I mentioned to you, when in your manufactory last year, that I would give my opinion of the Little Giant Corn and Cob Crusher, after I had made a fair trial of the one sent me,—this I now proceed to do, as an act of justice to all interested in its success. I have had it in operation a year and find it quite equal to my anticipations, if not beyond them. With two mules it will crush well upwards of 15 bushels of corn on the ears in the hour, easy work. If needful it might be made to reach 18. It adds *one-fifth* to the amount of food, to say nothing of the toll saved for grinding at a neighboring mill, four miles off, and the service of a man and a pair of oxen the entire day each trip. Indeed I can safely say, that it has saved me in the last twelve months, *four-fold* its cost, with corn at \$5 and \$6 a barrel, sold for in this neighborhood. I intended getting a machine to crush Guano this fall, but was disappointed, and I made an experiment with the Little Giant, and found it to answer admirably.—With one horse, it ground or crushed 15 to 20 bushels in the hour, and did it well. I shall of course save the price of the crusher. Upon the whole, I regard it as a most efficient and valuable machine, and with pleasure add my testimony in its favor, How long it will last, is to be proved.

Very respectfully, your ob't serv't,
A. STEVENSON.

Correspondence of the Cincinnati Daily Gazette.

MANSFIELD, Nov. 10th, 1855.

Quite an excitement was created here this afternoon, growing out of a contest between corn crushers. It appears that some two weeks since Messrs. Scott & Hedges, of Cincinnati, advertised in the papers of this city that they would give a silver cup to any mill that should grind faster and finer, with the same amount of power, than their mill the "Little Giant."

They appeared in due time upon the ground, with

two sizes of mills. The Leavitt mill, or Excelsior as it is called, was entered in competition by Messrs. Haft & Allen, who are manufacturing them in this place. Mr. Leavitt, the patentee, was present, and superintended the operating of his mill—who at first was unwilling to have the trial made with old dry corn. Mr. Hedges, who exhibited the Little Giant, insisted on using the old corn, as he was unwilling to have only a partial test, which would be the case if soft, new corn was used. Finally, after much hesitation, they yielded to Mr. Hedges' demand. The grinding commenced with the Little Giant, which ground a given quantity of corn in sixty-three revolutions, using two light horses on the No. 4 mill, which moved off easily and ground the amount without stopping. A half bushel of meal was sifted and about one quart of the amount was found too coarse to pass through the sieve. The committee who had been appointed to superintend and decide the contest, then repaired to the Leavitt mill, when the same amount of corn was ground, which required 73 revolutions, although Mr. Leavitt worked but one horse, which was a very heavy stout one the draught was evidently too hard for him, as he stopped three times and was allowed to rest. On sifting the meal there proved to be five or six quarts too coarse to pass the sieve, instead of one as in the case of the Little Giant. The committee after a few moments consultation reported substantially as above and returned the cup to Mr. Hedges, who thanked them kindly, and remarked that it twice before had been won over the Leavitt mill, and if a favorable occasion offered it would be risked again. Mr. Hedges then called the attention of those present, saying that he would grind some shelled corn—then put one bushel in the hopper, which was ground out in four minutes at a moderate walk. Mr. Leavitt ground a like quantity and was five minutes—his horse being hurried to considerably more speed—no sieve was used but it was admitted by all that it was much coarser than that ground by the Little Giant.

Mr. H. then, at the request of some farmers, ground some new corn very satisfactorily. Mr. Leavitt ground some also, which appeared very fine—but upon taking the mill apart, it was found to be gorged with cobs, admitting only the shelled corn to pass. In the opening of the contest the Little Giant had but few friends, all seeming to be in favor of "our Mill"—but the earnestness and assurance with which Mr. H. pressed the contest gained for it friends, although at one time there was a semblance of hostile demonstrations, which our good people soon quieted—and the matter ended quite pleasantly, and the Little Giant came off triumphant.

AN EYE WITNESS,

* The Little Giants are to be had of Messrs. ROEBIN, & BISS, Baltimore. Maryland.

RIDGEWAY SCHOOL.

THE next session of my School will begin on the first Monday in September and end on the last Friday of June, 1856. There will be a vacation of two weeks at Christmas. I charge \$220 for a whole session, or \$25 a month for any period less than a whole session. I furnish my pupils board, lodging, light, fuel, washing, and all else necessary to comfort, and make no extra charges for anything. I have three assistant teachers and am prepared to give instruction in every branch of education proper to fit boys to enter the University of Virginia. For further particulars apply to me Charlottesville, Va.

an—tf

FRANKLIN MINOR.

CRENSHAW & CO., COMMISSION MERCHANTS & GROCERS, North Side of the Basin, Richmond, Virginia.

HAVE always on hand a large assortment of Groceries.

A No. 1 Peruvian Guano, direct from the Agents.
A A and White Mexican do do do
Clover, Timothy, Orchard, Herds & Randall
Grass Seed, all of which they will sell on the best terms. We give our personal attention to the sale of all descriptions of produce and make liberal advances when desired. my

TO THE WOOL GROWERS OF VIRGINIA.

AS the new crop will soon be ready for market, we beg leave to call your attention to the advantages of our depot system for the grading and sale of wool. Notwithstanding the disadvantages under which we have had to labour during the past season on account of the dull state of the trade, we have made sales of all that we have received, at prices not only very satisfactory but exceeding any others that we have had of, for wool grown in this State. We therefore confidently refer all interested to those from whom we have had consignments the past year.

CRENSHAW & CO.,
my North side of the Basin, Richmond, Va.

PURE GAME FOWLS FOR SALE.

Bred from the best stock of English black breast, Lord Stanley, Suwarrow, English Blue Breast, Earl of Derby, English Game, Sumatra, Red and Black Mexican and Creole Game. Fowls sent to any part of the United States in good order prices ranging from \$2 50 to \$15 00 per pair. Fowls paid for when ordered.

Address J. M. L. ANDERSON.
jaif Ruther Glen P.O. Caroline county, Va.

DRAINING TILE.

The subscribers have constantly on hand any quantity of DRAINING TILE of the most approved patterns, which they will dispose of at the following prices:—1½ inch bore \$12 per thousand, about one foot bore each; 2½ inch bore \$15; 4 inch bore \$35; Gutter Tile \$20. They also keep on hand the best Sand Press Brick, \$15, and Fine Brick, \$25. Samples can be seen. Orders left at the office of American Farmer, or direct to the subscribers

RITTENHOUSE & CRAWFORD,
Brick Makers, W Pratt St., near the Cattle Scales,
jan tf Balt., Md



GRENOBLE HOSE.—A superior

Hose, manufactured of the finest Hemp—a cheap and excellent substitute for Leather and Gutta Percha. It is especially recommended to Planters, Nurserymen, Fire Companies, Steamboats, Manufactories, Dwellings, &c. It costs less than half the price of Leather, is lighter, stands as much pressure, is as durable, and is not subjected for its preservation to the expense of oiling or greasing, neither is it injured by frost.

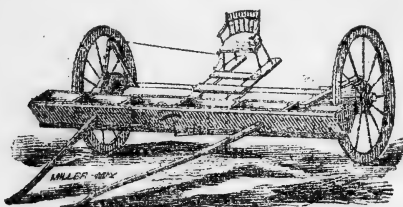
For sale, and orders for importation received in sizes from 1 to 7 inches in diameter, by CHARLES LENZMANN, 54 Cedar Street, N. Y., where Certificates of its superior qualities can be examined, from Alfred Carson, Esq., Chief Engineer of the New York Fire Department; from James McFarlan, Esq., Chief Engineer of the Union Ferry Company, and also from official authorities of some of the large cities of Europe. mar3tp

PIGS OF IMPROVED BREED FOR SALE.

I have for sale, to be delivered at weaning time, a good many pigs of improved breed. I have produced it myself from crosses of the Surry (or Suffolk) genuine Berkshire, (Dr. John R. Woods' stock) Irish Grazer, Chester County, No Bone and Dutchess. I think them superior hogs of medium size, and for fourteen years they have not had a bad cross among them. I prefer that purchasers should view my brood sows and my boar on my farm, three miles below Richmond. I will not sell them in pairs, because the in-and-in breeding would depreciate the stock at once and cause dissatisfaction, but I will sell in one lot several of the same sex. Price \$5 per head for one, and an agreed price for a larger number. They will be delivered on the Basin, or at any of the Rail Road Depots free of charge.

FRANK: G. RUFFIN.

Swansea Hill, Chesterfield, Jan. 4, 1855.



**SEYMOUR'S IMPROVED PATENT
BROADCAST SOWING MACHINE.**

THIS Machine was patented in 1845, and ten years have proved it to be unequalled in the United States, for the purposes for which it is designed.

It has but very little machinery, hence, when well made, it is very durable. It is capable of performing as follows: It sows correctly (and any desired quantity per acre,) all the various kinds of grain and seed commonly sown by farmers, from peas to the smallest seeds (Clover and Timothy mixed,) if desired, and all the fertilizers or manures of a dusty nature, which are so nearly reduced to a powder that the largest particles will pass through an aperture which will let through peas or corn, or which, having once been ground or made fine, and become lumpy by exposure, as plaster frequently does, can readily be reduced to powder by the action of the "plaster rod," which is a kind of coarse sheet iron saw, which is used in the machine, for distributing all such manures.

It is capable of dusting every inch of ground on an acre of land with less than half a bushel of plaster, and thirty or forty bushels of lime may be thus evenly applied to the same amount of land. It sows ten feet wide, and any narrower breadth may be sown at pleasure, merely with a "rod" with only teeth enough on to sow the breadth desired. It has received the highest recommendations from many hundreds of the best farmers of our country and received twelve premiums from Agricultural Societies, besides the Highest Prize and Diploma at the trial of Agricultural Implements, held at Geneva, July, 1852.

[The following is from the "Albany Cultivator, of June, 1848, by the Editor, L. Tucker.]

"This Cut represents Seymour's Sowing Machine, advertised in our last. It has been extensively used in Western New York, and is much approved. We saw many acres of various kinds of grain on the farm of John Delafield, Esq.,

near Geneva, last season, which had been sown with this Machine, and we never saw grain stand more evenly on the ground. Mr. Delafield assured us he could sow anything—lime, plaster, poudrette, guano, &c., or any seed, from grass seed to peas, or Indian corn, with perfect exactness, graduating the quantity per acre to a pint."

[Extract from an Address of the Hon. Geo. Geddes, before the Onondaga Co. Ag. Soc., 1854.]

The sowing of plaster by hand is a very unpleasant piece of hard work, and it is by far the best economy to use one of Seymour's machines. With these machines the plaster is evenly distributed over the whole ground, and for this reason a smaller quantity of plaster is required to touch every part of the surface.

[From Ed. Southern Planter, Va., April, 1855.]

SEYMOUR'S PATENT BROADCASTING MACHINE.—We again call the attention of our subscribers to this Machine. Since the last number of the Planter was published we have sowed with it one hundred acres in oats, and they are now up. We never had a crop so well seeded or that promised better.

As to the quantity of work it will do, we can only state our own experience. One horse works the machine with perfect ease, it being no heavier than a single gig. The driver, in our case, was so engaged that he could not get to the work sooner than an hour by sun, and had to leave it about the same time in the evening. We had four three-horse harrows in the field and a three-horse plough to sweep the water furrows. The land required only one harrowing to get it in order, the tith upon the fall and winter ploughing being remarkably fine. Dividing the work of preceding and following the Machine, as occasion required, so as to keep all the work well up together, we found that it was perfectly able to keep ahead of them. It sows a breadth of ten feet, as fast as a horse can walk, and carrying two bushels at a time, does not require as many stoppages as are necessary with a man who seeds by hand and can carry a much less supply with him. The seeding, too, is entirely independent of the wind, and was done with us as well during very high winds, which prevailed most of the time, as during a calm, because the seed are delivered so close to the ground. We not only recommend the machine, therefore, to every farmer, but we urge them to buy it, not on Mr. Seymour's account, who is nothing to us, but on their own.

ALBEMARLE, VA., MARCH 7, 1855.

I purchased one of Mr. Seymour's Plaster Sowers in 1854, and it was used by myself and a neighbor in sowing thirty or forty tons of Plaster. I purchased another in the Fall of 1854, and I am now using both. One hand with an ordinary horse can sow, without difficulty, twenty to twenty-five acres a day. The distribution is as perfect as possible. I am certain that every square inch of an acre was dusted by one third of a bushel. My neighbor Mr. F. K. Nelson thinks he effected it with one peck. I cannot speak too highly of this machine as a plaster sower. It sows timothy seed and clover. I have not tried it with wheat, but feel assured it will answer well.

T. J. RANDOLPH.

FREDERICKSB'G, VA., Oct. 19, 1855.
TO MESSRS. WELLFORD, EASTHAM & Co.

Gentlemen:

At your request I with pleasure give you my opinion of Seymour's Patent Sowing Machine, which I have used with perfect satisfaction for two years past, in sowing wheat. Last year sowed with

one of these machines 300 bushels; it sows ten feet wide and distributes the seed with perfect regularity over the surface at any rate you may desire to the acre. The quantity is indicated by an index, to which a pointer is attached, and a small boy capable of filling the box with wheat, and driving so as not to vary much from the track of the machine, can manage it as well as a grown person. The grain is not affected by windy weather. I think I can safely recommend the machine to the Agricultural Community.

Very respectfully, your obedient servant.

ROBERT W. CARTER.

They are all made under the supervision of the inventor, and it is intended that every machine shall be made as it should be; for we are well aware that if we allow bad work or materials, the evil is greater to ourselves than to the purchaser. The price with all improvements made previous to 1845, is \$55. In July, 1855, an improvement was patented which when applied increases the price to \$60. Since that time another very valuable improvement has been perfected; and with these late improvements, the value of the machine to the purchaser is nearly or quite doubled, while the price is only increased to \$65. Another box, placed behind the wheels, will be furnished to order at \$25. With this, grain or seed may be sown while sowing some other seed or substance from the main box. This can be removed or replaced in five minutes.

Reference is made to all the Presidents of the New-York State Agricultural Societies who have presided since 1845, and as they are in use by intelligent farmers in half the States in the Union, as well as in Canada, we would refer to all these gentlemen to testify to their excellence:

S. Sands & Worthington,	Baltimore, Md
D. C. Randolph,	Richmond, Va
C. R. Mason,	King George C. H.
C. C. Baldwin,	Richmond,
S. S. Henley,	Walkerton,
Erasmus Taylor,	Meadow Farm,
E. H. Osborne,	Petersburg,
Edward Hill,	Aylett,
Dr. W. Gwathey,	"
Sam'l Ayres,	Richmond,
D. A. Claiborne,	Halifax Co,
W. R. Bland,	Notoway,
N. M. Osborne,	Prince George,
E. Brown,	Wiconico Ch,
W. S. Rylands,	Aylett,
J. T. Henley,	Walkerton,
R. B. Watkins,	Mechanicsville,
W. Y. Downman,	Smithfield,
F. G. Ruffin, Ed. Southern Planter,	Richmond,
Miles C. Seldon,	Powhatan,
Wm. T. Samuel,	Aylett,
R. M. Bridges,	Brandy Station,
R. P. Atkinson,	Dinwiddie,
J. P. Taliaferro,	York Co,
R. B. Haxall,	Richmond,
T. J. Randolph, Jr.,	"
Dr. P. B. Pendleton,	Tolersville,
Dr. Jas. L. Jones,	Gordonsville,
Lewen T. Jones,	Loudoun, Co,
Hon. T. C. Peters,	Darien.
W. B. Bowerman,	Scotsville.
H. Munson, Pres. two Ag. Soc.	E. Bloomfield, N. Y.
E. M. Bradley, Sec.	do.
Ira Peck, Pres't town Ag. Soc.	do.
T. H. Kellog, Jr. Sec. town Ag. Soc.	do.
Guy Collins,	do.
N. Steel,	do.
M. Adams,	do.
Dea. Pomeroy,	do.
Luther Munson,	do.
W. J. Taylor,	do.

G. North,	E. Bloomfield, N. Y.
Hiram Steel,	do.
Wm. Carter,	do.
F. N. Toby,	do.
Moses Eggleston,	do.
Ten Eyck Munsen,	do.
Rufus Humphrey,	Victor, N. Y.
M. Norton,	do.
Levi Boughton,	do.
D. D. T. Moore, Ed. Rural New Yorker,	Rochester.
W. Kelly, Pres. N. Y. A. S.	Rhineback.
L. G. Morris, Pres. N. Y. S. A. S.	Mt. Fordham.
A. Van Bergen, Pres. N. Y. S. Ag. Soc.	Coxsackie.
Hon. C. H. Carroll,	Groveland.
L. Bradner, Pres. Bank of	Danville.
H. Keeler,	S. Salem.

C. H. SEYMOUR.

East Bloomfield, Ontario, N. Y., 1856. fe 17

KOSSUTH.



This justly renowned trotting Stallion, who has received the First Premium two years in succession (1854 and 1855) at the Virginia State Agricultural Fair, and who is now pronounced by competent judges to be one of the purest bred and fastest trotting Stallions in America—will commence his season, (limited to fifty mares) on the 1st of March, at the stable of the subscriber, on the Mechanicsville Turnpike, one mile from the City of Richmond—and on Tuesday, 1st day of April, will be at the farm of Mr. Henry A. Winfree, near the Half Way house, in Chesterfield County, where he will make a regular stand of two days in each week throughout the season. The season will expire on the 1st of July.

TERMS:—\$25 the season, the money in all cases to be paid at the first time of serving the mare insurance. Groom fee \$1.

DESCRIPTION & PEDIGREE OF KOSSUTH.

Was foaled in Columbia County, State of New York; is a beautiful rich dark brown, five feet three inches high, of great muscular power and symmetry of form, docile disposition, and can trot his mile inside of two minutes and forty seconds to a wagon. His Colts are remarkably fine and promising, and as a proof three of them received first class premiums at the last State Agricultural Fair, and from 2 to \$400 a piece has been refused for some of them at six months old.

Kossuth was sired by that world renowned trotting horse New York Black Hawk, out of the well known trotting Mare Lady of the Lake, and she out of a thorough bred Mambrino Mare, The sire of black Hawk was the celebrated stallion Andrew Jackson. The sire also of Jackson, Kemble Jackson, Henry Clay, Young Andrew Jackson and large numbers of other fast ones, the fastest trotting horse of his day, he was sired by Young Bashaw, who was by Imported Grand Bashaw. The dam of Andrew Jackson was by Why Not, and Why Not by old Imported Messenger, the Grand dam of Jackson also by Messenger. Black Hawk's dam was the distinguished trotting Mare Sally Miller, who has trotted her mile in two minutes and thirty seconds, and was not excelled by any horse of her time. She was got by Tippoo Saib, and he by imported Messenger, her dam by Gunpowder. Black Hawk's time with heavy weight is the best on record, up to the time of his death, and established his claim to be the best trotting Stallion in America.

PERFORMANCES OF BLACK HAWK.

Nov. 17, 1847, beat Jenny Lind in a match over the Union Course, mile heats: Black Hawk to a 250 lb. wagon, Jenny Lind to a skeleton wagon weighing about 75 lbs, winning the first and third heats in 2 40, 2 43.

April 25th, 1848, beat Lady Sutton in a match over the same course, mile heats, best 3 in 5, to 250 lb. wagons: time 2 43; 2 43; 2 42; 2 45½.

May 15th, 1848, beat Americus over the same course in a match for \$2000; three mile heats to 250 lb wagons; time 8 31; 8 36.

For further performance see Turf Register for 1847 and 1848; where will also be seen the challenge of his owner to trot him against any horse in the world for any amount from \$500 to \$5000; which challenge was never accepted. Subsequently \$13,000 was refused for him.

Kossuth having been kept solely as a breeding Stallion, has made but one performance on the turf, and that over the Union Course, Long Island, on the 1st of Sept. 1855, in a match of two mile heats, in harness, against Mr. F. Felton's black Stallion Ticonderoga, Kossuth winning with ease, in two straight heats, in the last one, Ticonderoga barely saving his distance (160 yards.)

Kossuth had made a large season, (serving 84 mares,) and been in training only one month, suffering all the while from a severe cold, taken on his passage from Richmond to New York, and was so evidently out of condition, that I was advised to withdraw him; but knowing his endurance I was determined he should trot, and had the gratification to see him not only win, but make a race under the circumstances, creditable to any horse. A few weeks subsequent to this race, he made a trial to a wagon, which in speed will compare with if not surpass, that of any trotting Stallion in the world. By reference to my bills, it will be seen that Kossuth belongs to a trotting family—the best in America, and traces his blood for upwards of half a century, through a line of choice ancestors—all celebrated for speed and great endurance—and goes back to some of the purest Arabian and English horses.

Persons wishing to breed from Kossuth, would do well to make early application, as he will positively not exceed the limit.

Mares sent from a distance will be well taken care of, at my stable, at forty cents per day.

H. J. SMITH.

Richmond, Jan. 29th, 1856.

fe3t

PREMIUM MACHINES.

MY PATENT STRAW CUTTER AT \$10 was awarded the first premium offered by the Virginia State Agricultural Society for the best hand Straw Cutter to be exhibited at their Fair in 1853. At the State Fairs in 1854 and 1855, it again competed with all others, and each year received the highest award of the Society. Besides this evidence of superiority, I offer, to all persons not familiar with it, the machine, subject to be returned in a month, if, after trial, it does not prove the best machine at any price, considering its combined advantages for cutting hay, oats, stalks, shocks, vegetables, &c. The machine, when to go long distances, will be securely packed, without charge, so as to occupy but 4 cubic feet, and may be sent to any part of the United States at a trifling cost. Notes on any solvent banks, or reference, enclosed with order, will secure prompt attention.

My CYLINDER CORN SHELLER, capable of shelling 300 bushels in a day by hand, and my combined machine, capable of shelling 300 by hand, and six hundred by horse power, were each awarded the first premium as above, in 1855. They are warranted to be of superior workmanship, and not liable to be put out of order.

My THRESHERS have been awarded ALL THE PREMIUMS offered by the State Agricultural Society in 1853, 1854 and '55, after each year competing with all the

prominent threshers manufactured in this and many of the Northern States. Purchasers may, in addition to the above evidence of merit, have the experience of more than one thousand farmers using them.

Pitts' THRESHER AND SEPERATOR, with Cleaner attached, and mounted on wheels, was awarded, in 1853, 1854, and 1855, the highest premium offered for the best Thresher and Cleaner. I am manufacturing these machines in a superior manner, and shall be able to furnish all orders given in time for their completion.

Hussey & McCormick's REAPER, with all late improvements for horse-power, stationary and portable Threshers, wheat Fans, Straw Cutters for power, shellers for hand at \$9, and for one horse or steam power \$45, shelling 1,500 bushels a day; Harrows, Seed Drills, Horse Rakes, Hay Presses, Land Rollers, Lime spreaders, Machine Belting of all kinds, with a general assortment of Agricultural Machinery and Tobaccoists' Fixtures, kept constantly on hand, or furnished at short notice, at my Factory, on Main and 19th streets, Richmond, Va.

Farmers having Reapers or Threshers for repair will promote their own interest by sending them early.

Feb 19

H. M. SMITH.

GENUINE GARDEN SEEDS.

THE undersigned begs to inform his patrons and the public generally, that he has just completed his supply of the above from England and the Continent. Viz: Early Peas, Beans, Early York, Large York, Flat Dutch, Drumhead, and many other Cabbages; Cauliflowers, Beets, Celery, Egg Plants, Lettuces, Onions, Peppers, Short Top Radishes, Tomatoes, Carrots, &c., with all other Vegetables and herbs in the Trade.

From his long experience and connection in the Seed Trade he can warrant them of first rate excellence, and at very moderate prices, either wholesale or retail.

FLOWER SEEDS of the choicest kinds, and what are specially suited to this climate, are offered in Collections, at the following rates, free by mail:

100 Packets, very choicest,	\$5 00
100 " second,	4 00
50 " choicest,	2 50
50 " second,	2 00

Orders by Mail promptly attended to. Catalogues can be had on application.

JOHN SAUL,

Seed Warehouse, 396 7th st., corndr H. st.
mh2t WASHINGTON CITY, D. C.

SALARATUS.

The subscribers offer to the trade Salaratus of different grades of strength, which they claim to be of superior quality to any other in market, and entirely free from any deleterious ingredients.

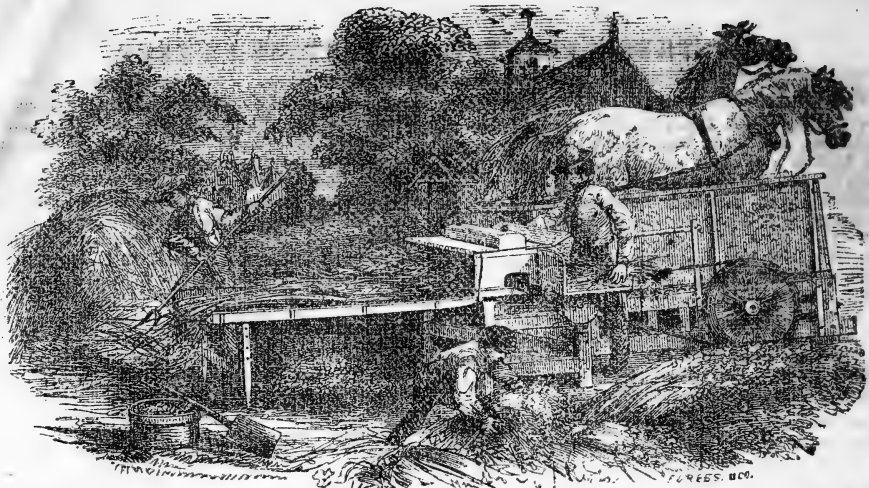
We are the only manufacturers whose process of manufacture is conducted under the immediate superintendence of an experienced practical chemist. Having been engaged for several years in the manufacture of our peculiar kind of Salaratus, and being the originator of those manufactured, we can offer to consumers a guarantee of its great excellence which no other manufacturer can do; the new kind of Salaratus pompously set forth, under various names, in different advertisements, being merely imitations of the article we originally introduced to the public.

We warrant the quality of all goods sold by us, and agree to return the purchase money, together with expenses of transportation, on every article that proves to be inferior to our representation of its quality.

JOHN DWIGHT & CO.

Mh3t*

No. 112 Pearl Street, New York.



ALBANY AGRICULTURAL WORKS,

ON HAMILTON, LIBERTY & UNION STS.

WAREHOUSE, SEED STORE, AND SALES ROOMS,

NO. 52 STATE STREET, ALBANY, N. Y.

EMERY BROTHERS,

Sole Proprietors and Manufacturers of Emery's Patent Railroad Horse Powers and Overshot Threshing Machines and Separators. Also Manufacturers of and Wholesale Dealer in

AGRICULTURAL MACHINES AND IMPLEMENTS

Of the latest and most improved kinds extant.

DEALERS IN GRAIN, FIELD, GRASS, GARDEN & FLOWER SEEDS & FERTILIZERS.

The Horse Powers, together with the great variety of **LABOR-SAVING MACHINES**, to be propelled thereby, being the leading articles manufactured by the proprietors, the attention of the public is especially called to them. Full **DESCRIPTIVE ILLUSTRATED CATALOGUES** containing directions, prices and terms of sale, warranty and payment, sent by mail, gratis, to all post-paid applications.

Upwards of Twelve Hundred sets of the above celebrated machines, have been made and sold in this city alone during the last twelve months, and without supplying the demand. The public may rest assured the reputation heretofore earned for their manufactures, shall be fully sustained, by using none but the best material and workmanship; and by a strict attention to business, they hope to merit and enjoy a continuance of the patronage heretofore so liberally bestowed.

As large numbers of Powers and other machines are being offered in various sections of the country, resembling those of the above manufacturers in almost every particular, it becomes necessary to caution the public against the deception, and to enable their own to be distinguished from all others, they would say, the words "Emery's Patent"

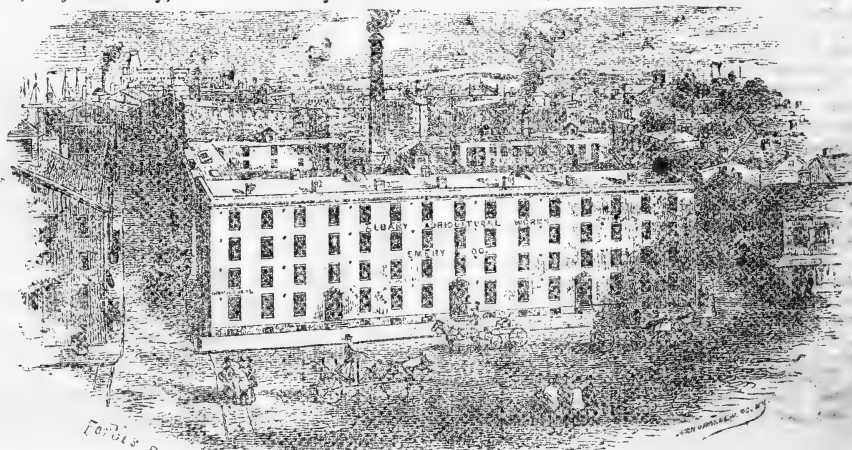
are upon all the small wheels, "Emery" upon the links of the chain, and the name "Emery" in some manner, and all in raised letters, is cast upon some or all the iron parts of their machines, beside the woodwork being also stencilled, in a conspicuous manner, with the names of the proprietors and their place of business.

WARRANTY, CAPACITY, ECONOMY.

The Two Horse Power and Thresher, as represented by circulars, is capable, with three or four men, of threshing from 175 to 225 bushels of wheat or rye, and the **ONE HORSE POWER** from 75 to 100 bushels of wheat or rye; or both kinds of powers, &c., are capable of threshing double that amount of oats, barley or buckwheat per day, of ordinary yield.

These Power Threshers, &c., are warranted to be of the best materials and workmanship, and to operate as represented by this circular, to the satisfaction of the purchasers, together with a full right of using them in any territory of the United States, subject to be returned within three months and home transportation and full purchase money refunded if not found acceptable to the purchasers.

mh2t





SAMUEL S. COTTRELL,
SADDLE AND HARNESS MANU-
FACTURER, Wholesale and Retail,
No. 118 Main Street, Richmond, Va.,
having received the first premium at the
Fair of the Virginia Mechanics Institute,
in 1854, and a Silver Medal at the Fair
of the same Institute in 1855, feels con-
fident he can please all persons in want
of any article in his line. Marly

ATKINS' AUTOMATON:

OR,

SELF-RAKING REAPER AND MOWER, BEST MACHINE IN USE.

1 (the first) used in 1852.

40 used successfully in 1853.

300 in twenty different States in 1854.

1200 in all parts of the Union in 1855.

3000 building for the harvest of 1856!

THERE ARE SIX GOOD REASONS FOR THIS unparalleled increase and great popularity; 1st. It is strong and reliable, and easily managed. 2d. It saves the hard labor of Raking. 3d. It saves at least another hand in binding. 4th. It saves shattering by the careful handling in raking; besides, the straw being laid straight, it is well secured in the sheaf, and does not drop in the after handling, and the heads are not exposed in the stack, so that the GRAIN saving even exceeds the LABOR saving. 5th. It is a good Mower, being one of the best convertible machines in use. 6th. It has a knife that does not choke.

Its other excellencies, too numerous to mention here, are fairly given in the circulars. Its intrinsic worth is also attested by the award (mostly in only three years) of

OVER 70 FIRST PREMIUMS!

PRICE—REAPER AND MOWER, \$200,—\$75 on its receipt, \$75 first September, and \$50 first December. Price of SELF-RAKING REAPER only \$175. Considerable saving in freight to those at a distance who order prior to 1st March; also liberal discount for advance payment.

To secure a machine, order immediately. Though so little known the past season, and none ready for delivery, till 1st May, yet not two thirds the customers could be supplied. The reputation of the Machine is now widely established, so that THREE THOUSAND will not as nearly supply the demand as twelve hundred did last year, and we shall also be selling four months earlier.

Order early, if you would not be disappointed.

PAMPHLETS giving IMPARTIALLY the OPINIONS OF FARMERS, together with orders, notes, &c., mailed to applicants, and prepaid.

Write to us at CHICAGO, (Ill.) DAYTON, (Ohio,) or BALTIMORE, (Md.) whichever is nearest to you.

J. S. WRIGHT & CO.

"Prairie Farmer" Works, Chicago, Dec. 1st. 1855.
mar 4t

BEE HIVES.

To those interested in keeping hives it will be important to know, that a hive can be constructed with all the following advantages.

The bees may be made to swarm from one or more hives, or may be conducted into any number of hives without swarming, and still have a full supply of queens. They are protected from the bee moth and other insects, if managed according to directions given in the book, which accompanies every hive.

The bees can exercise without going out too early to die on the snow in spring. The filth can at any time be removed from the hives without disturbing the bees. The bees can be transferred as often as necessary to give them new comb without killing them.

It prevents all possibility of robbing whilst feed-

ing, it is thoroughly ventilated throughout the feed drawers, hives, honey boxes and chambers.

The work and progress of the bees may be seen in the hives and honey boxes at any time. A medal was awarded the inventor, S. Davis, at the exhibition of the industry for all Nations in New York in 1853.

The following certificate will show that the hive has merits of a superior order:

We the undersigned, inventors and exhibitors at the Exhibition of the Industry of all Nations, at New York, hereby certify that we have examined, with much care a Platform Bee-Hive, invented and patented by Sylvester Davis, of Claremont, New Hampshire, and must say that it possesses more practical advantages for Bee-keeping than any hive we have ever seen, and do believe that all who may be interested in the culture and management of that most interesting insect, will find it much to their advantage to use Mr. Davis' Hive, and adopt his system of keeping Bees. We therefore most heartily beg leave to recommend it to those interested.

J. FRANKLIN REIGART, Lancaster, Pa. Inventor.

DR. WM. FIELD, Wilmington, Del. Inventor.

WM. B. COATS, Washington, D. C. Inventor.

WM. G. MAXNARD, New York City, Exhibitor.

WM. REDING, Flemington, N. Jersey, Inventor.

HAMMOND HOWE, Cincinnati, Ohio, Inventor.

L. A. LYON, Ohio, Exhibitor.

J. B. TILLINGHURST, Pt. Harmar, Ohio, Inventor.

WM. H. GIBBS, Washington, D. C. Inventor.

HIRAM SANDS, Washington, D. C. Inventor.

JOHN G. GARRITSON, Salem, Iowa, Inventor.

L. F. HOLMES, New York, Exhibitor.

THOS. FARMER, Camden City, N. J., Exhibitor.

AUGUSTUS ELLIOTT, San Francisco, Cal., Inventor.

MICHAEL NUTTING, Portland, Me., Inventor.

BENJ. H. OTIS, Syracuse, N. Y., Inventor.

DR. T. G. CLAYTON, Norfolk, Va., Inventor.

JOSEPH E. HOLMES, Newark, Ohio, Inventor.

The price of a stand of four hives is \$12, the right for an individual to use any number, with full printed instructions for building, is \$10. Some of the hives are now ready for delivery.

Instructions to build, with right, will be sent to order by mail.

H. M. SMITH,
Manufacturer of Agricultural Machinery,
mar 3t Richmond, Va.

LIME—LIME—LIME.

TO FARMERS, BRICKLAYERS, AND OTHERS.

Having made arrangements for a regular supply of shells, I am prepared to furnish any quantity of well burnt Shell Lime, as low or lower than can be procured elsewhere. It will be delivered to farmers at any of the railroad Depots, and to customers in the City wherever they may desire.

Application to be made at my Lime Kilns, opposite Tredegar Iron Works, at Mr John G. Werth's office, corner 10th Street and Basin Bank, or at Messrs. Smith and Harwood's Hardware Store, Main Street, Richmond.

Jan ly

WILLIAM SMITH.

LEWIS HILL,

PRODUCE COMMISSION MERCHANT,

ATTENDS TO THE SALE OF

WHRAT, FLOUR, CORN AND TOBACCO.

OFFICE ON GOVERNOR OR THIRTEENTH ST.,

RICHMOND, VA.

dec 1—17

TO FARMERS AND GARDENERS.

Your attention is called to the Manures manufactured by the Lodi Manufacturing Co. from the contents of the sinks and privates in New York City, and free from offensive odor, called

POUDRETTE AND TAFEU.

Poudrette is composed of two-thirds night soil and one third decomposed vegetable fibre. Tafau is composed of three-fourth night soil and one-fourth No. 1 Peruvian Guano.

These manures are cheaper and better adapted for raising Corn, Garden Vegetables and Grass, than any other in market. Can be put in contact with the seed without injury, and causes Corn and seeds to come up sooner, ripen two weeks earlier, and yield one third more than other manures, and is a sure preventative of the cut worm.

Two bbls of Poudrette or 100 bbls. Tafau, will manure an acre of Corn in the hill. Tafau 1 3/4 cents per lb. Poudrette \$2 00 per bbl. or \$1 50 for any quantity over 7 bbls., delivered on board vessel or railroad free from any charge for package or cartage. A pamphlet containing every information sent, post paid, to any one sending their address to

THE LODI MANUFACTURING CO.

3t 60 Courtlandt-st., New York

WORMS! WORMS! WORMS!

A great many learned treatises have been written, explaining the origin of, and classifying the worms generated in the human system. Scarcely any topic of medical science has elicited more acute observation and profound research; and yet physicians are very much divided in opinion on the subject. It must be admitted, however, that, after all, a mode of expelling them and purifying the body from their presence is of more value than the wisest disquisitions as to their origin.

Such an expelling agent has at last been found. Dr. M'Lane's Vermifuge proves to be the much sought after specific—its efficacy being universally acknowledged by the entire medical faculty. As further proof, read the following from a lady—one of our own citizens:

NEW YORK, Oct. 15, 1852.

This is to certify that I was troubled with worms for more than a year. I was advised to use McLANE'S CELEBRATED VERMIFUGE. I took one bottle, which brought away about fifty worms; I commenced improving at once, and am now perfectly well. The public can learn my name and further particulars, by applying to Mrs. Hardie, No. 3, Manhattan place, or to E. L. Theall, Druggist, corner of Rutgers and Monroe streets.

P. S.—Dr. M'Lane's Celebrated Vermifuge, also Dr. M'Lane's Liver Pills, can now be had at all respectable Drug Stores in the United States.

Purchasers will please be careful to ask for, and take none but Dr. M'LANE'S VERMIFUGE. All others, in comparison, are worthless. ap

DR. M'LANE'S LIVER PILLS.

When the proprietor of this invaluable remedy purchased it of the inventor, there was no medicine which deserved the name, for the cure of Liver and Billious complaints, notwithstanding the great prevalence of these diseases in the United States. In the South and West particularly, where the patient is frequently unable to obtain the services of a regular physician, some remedy was required, at once safe and effectual, and the operation of which could in no wise prove prejudicial to

the constitution. This medicine is supplied by Dr. M'Lane's Liver Pills, as has been proved in every instance in which it has had a trial. Always beneficial, not a solitary instance has ever occurred in which its effects have been injurious. The invention of an educated and distinguished physician, it has nothing in common with the quack nostrums imposed upon the public by shallow pretenders to the medical art. Experience has now proved, beyond a doubt, that Dr. M'Lane's Pill is the best remedy ever proposed for the Liver Complaint.

Purchasers will be careful to ask for Dr. McLANE'S CELEBRATED LIVER PILLS, and take none else. There are other Pills, purporting to be Liver Pills, now before the public. Dr. M'Lane's Liver Pills, also his Celebrated Vermifuge, can now be had at all respectable Drug Stores in the United States and Canada. ap

AYER'S CATHARTIC PILLS!**PILLS THAT ARE PILLS!!**

PROF. HAYES, State Chemist, of Massachusetts, says they are the best of all PILLS, and annexed are the men who certify that Doct. Hays knows, viz:

LEMUEL SHAW, Chief Justice Supreme Court Mass.

EMORY WASHBURN, Governor of Mass.

W. C. PLUNKETT, Lieut. Gov. of Mass.

EDWARD EVERETT, Ex-Sec. of State of Mass. and Senator of United States.

R. C. WINTHROP, Ex-speaker House Rep. U.S.

ABBOTT LAWRENCE, Minister Plenipot. to Great Britain.

JOHN B FITSPATRICK, Catholic Bishop, Boston.

MEN THAT ARE MEN!

Among the diseases this Pill has cured with astonishing Rapidity, we may mention

Costiveness, Billious Complaints, Rheumatism, Dropsy, Heartburn, Headache arising from foul Stomach, Nausea, Indigestion, Morbid inaction of the Bowels, and pain arising therefrom, Flatulency, Loss of Appetite, all Ulcerous and cutaneous Diseases, which require an evacuant Medicine, crufola or King's Evil. They also by purifying the blood and stimulating the system, cure many Complaints which it would not be supposed they could reach; such as Deafness, Partial Blindness, Neuralgia and Nervous Irritability, Derangement of the Liver and Kidneys, Gout, and other kindred complaints, arising from a low state of the body, or obstructions of its functions. They are the best Purgative Medicine ever discovered, and will but need to use them once to know it.

Prepared by DR. J. C. AYER, Lowell, Ms., and sold by every respectable Druggist in New England. Ap2t

IMPROVED SUP. PHOS. LIME.

The subscriber continues to manufacture the above at his Bone Mill, near the city, and having appointed Messrs. BRANCH & Co., Richmond, and T. BRANCH & SONS, Petersburg, agents, all orders addressed to them will be promptly attended to. His price is \$40 per ton, and the quality is fully equal to any manufactured out of the State. Those in want would do well to order soon, that none may be disappointed: Annexed will be found one out of many certificates. R. R. DUVAL.

CERTIFICATE.

Having used R. R. Duval's Super. Phosphate of Lime both on Corn and Wheat, I am much pleased with its effects, and take pleasure in recommending it. I consider it equal, if not superior, to any manufactured out of the State.

J. LUCIUS DAVIS,

mh-1f Henrico, Va.

DISEASES OF THE LIVER.

When the celebrated Dr. Rush declared that drunkenness was a disease, he enunciated a truth which the experience and observation of medical men is every day confirming. The many apparently insane excesses of those who indulge in the use of spirituous liquors, may thus be accounted for. The true cause of conduct, which is taken for intonation, is very frequently a diseased state of the Liver. No organ in the human system, when deranged, produces a more frightful catalogue of diseases. And if, instead of applying remedies to the manifestations of disease, as is too often the case, physicians would prescribe with a view to the original cause, fewer deaths would result from diseases induced by a deranged state of the Liver. Three-fourths of the diseases enumerated under the head of Consumption, have their seat in a diseased Liver.—(See Dr. Gunn's great works.)

Purchasers will be careful to ask for Dr. McLANE'S CELEBRATED LIVER PILLS, and take none else. There are other Pills, purporting to be Liver Pills, now before the public. Dr. McLane's Liver Pills, also his celebrated Vermifuge, can now be had at all respectable Drug Stores in the United States and Canada. ap1t

DR. McLANE'S VERMIFUGE.

During a practice of more than twenty years, Dr. McLane had attended innumerable patients afflicted with every form of worm diseases, and was induced to apply all the energies of his mind to the discovery of a vermifuge, or worm destroyer, certain in its effects; the result of his labors is the American Worm Specific, now before the public, which is perfectly safe, and may be given alike to children of the most tender age or to the adult; it purges mildly and subdues fever, and destroys worms with invariable success. It is easy of administration, and as it does not contain mercury in any form whatever, no restrictions are necessary with regard to drinking cold water, nor is it capable of doing the least injury to the tenderest infant. An incredible number of worms have been expelled by this great vermifuge.

Purchasers will please be careful to ask for Dr. McLANE'S CELEBRATED VERMIFUGE, and take none else. All other Vermifuges, in comparison, are worthless. Dr. McLane's genuine Vermifuge, also his Celebrated Liver Pills, can now be had at all respectable Drug Stores in the United States and Canada. ap1t

MOWING AND REAPING MACHINES.

ALLEN'S CELEBRATED REAPING and MOWING MACHINES—These never clog, and can be worked on rough and stony surfaces. Wright's Reaper with Atkins's Self-raker; Manny's, McCormick's, and Hussey's Reapers, Ketchum's mower, and all other good machines.

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Manufactured and for sale by

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Petersburg, Va.

We learn that a factory has been established in the City of Petersburg for the purpose of manufacturing the Reaping Machine patented by Rob't J. Morrison of this city. A model of this machine was exhibited at the late State Agricultural Fair. It attracted the attention of thousands of our best farmers, and received the commendation of the Committee on Reapers. The report of this committee was published in the December number of this paper. Those who desire to purchase this implement, should without delay address Messrs. W. E. MORRISON & MOORE, Petersburg, whose advertisement will appear in the next number of this paper.—*Southern Planter*.

Extract from report of Committee on Reapers:

"They would call attention of the Society to a new Reaper and Mower, a Virginia invention, patented by Robert J. Morrison, of the City of Richmond, differing in some important respects from others, which, after, a careful examination, they believe will prove a valuable machine.—Among other improvements, they would mention the covering and protection of the driving power from dirt, &c., preventing wear and tear and clogging. The facility with which it can be thrown out of gear, the peculiarity of the gear, the upper lid having a slight vertical motion, but no lateral, forming scissors without a pivot, cleaning the cutter, and at the same time opposing a cutting edge to the cutting edge of the knife, &c." ap1f

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A Farm of two or three hundred acres of land, below the blue ridge and above tide water in a healthy section, which will afford at the same time, a good location for a physician, and a good situation for a Female Boarding School. Apply at the office of the Southern Planter, by letter, giving full description of premises and neighborhood. aptf

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The following, from a customer, shows the demand which this great medicine has created wherever it has been introduced.

BLOSSBURG, Tioga Co. Pa., March 30, 1850.

Gentlemen—In consequence of the great consumption of your "Worm Specific" in this place and vicinity, we have entirely exhausted our stock.

We should feel obliged by your forwarding, via Corning, N. York, 20 dozen, with your bill, on the reception of which we will remit you the money.

From the wonderful effects of said "Specific" in this neighborhood, there could be sold annually a large quantity, if to be had, (wholesale and retail) from some local agent. If you would compensate a person for trouble and expense of vending, I think I could make it to your advantage to do so.

Yours respectfully, WM. M. MALLORY.

MESSRS. J. KIDD & CO. Per W. E. PORTER.

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AGENCY FOR THE PURCHASE AND SALE OF IMPROVED STOCK.—Stock Cattle of all the different breeds, Sheep, Swine, Poultry, &c. will be purchased to order, and carefully shipped to any part of the United States, for which a reasonable commission will be charged. Apply to **AARON CLEMENT**, Philadelphia. Refer to Gen. Wm. H. Richardson, Richmond, Virginia. N.B. All letters (post-paid) will be promptly attended to. apj 53—tf

THE GREAT RESTORATIVE.

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Mr. Jonathan Hougham, of West Union, Park County, Illinois, writes to the proprietors that he had suffered greatly from a severe and protracted attack of Fever and Ague, and was completely restored to health by the use of the Liver Pills alone. These Pills unquestionably possess great tonic properties, and can be taken with decided advantage for many diseases requiring invigorating remedies; but the Liver Pills stand pre-eminent as a means of restoring a disorganized Liver to a healthy action; hence the great celebrity they have attained. The numerous formidable diseases arising from a diseased Liver, which so long baffled the skill of the most eminent physicians of the United States, are now rendered easy of cure, thanks to the study and perseverance of the distinguished physician whose name this great medicine bears—a name which will descend to posterity as one deserving of gratitude. This invaluable medicine should always be kept within reach; and upon the appearance of the earliest symptoms of diseased Liver, it can be safely and usefully administered. May 11

SHELL LIME.—I have for sale, and will keep constantly on hand, at my lime kilns near Capt. Goddin's tavern, on Bacon Quarter Branch, a large supply of the best quality of Shell Lime. Farmers and others in want of this article, can get their orders filled by applying at my kilns or addressing me through the city post office. ap 1y

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For the rapid cure of Coughs, Colds, Hoarseness, Bronchitis, Whooping-Cough, Asthma and Consumption, is universally known as the best remedy ever yet discovered for every variety of Pulmonary disease. So wide is the field of its usefulness and so numerous the cases of its cures, that almost every section of the country abounds in persons publicly known, who have been restored from alarming and even desperate diseases of the lungs by its use. When once tried its superiority over every other medicine of its kind is too apparent to escape observation, and where its virtues are known, the public no longer hesitate what antidote to employ for the distressing and dangerous affections of the pulmonary organs which are incident to our climate. By its timely use many, nay almost all attacks of disease upon the Lungs or throat, are arrested and thus are saved many thousands every year from a premature grave. No family should be without it, and those who do neglect to provide themselves with a remedy which wards off this dangerous class of diseases will have cause to deplore it when it is too late. Proofs of the surprising efficacy of the Cherry Pectoral need not be given to the American people,—they have living proofs in every neighborhood. But those who wish to read the statements of those whose whole health

has been restored and whose lives have been saved by its use, will find them in my American Almanac which the agent below named has to furnish gratis for every one.

Prepared by Dr. J. C. AYER, Lowell, Mass.,—and sold by all respectable Druggists everywhere.

THE VIRGINIA SUBSOIL PLOW.

Shovel Plow and Coulter, which took the premium at the Virginia State Fair 1855, can be purchased of the inventor at \$10. or of Meade & Eaches, Alexandria. Having been thoroughly tested is believed to be the only reliable Subsoil Plow in use. Patent applied for.

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Jan. 1st, 1856 ja3m

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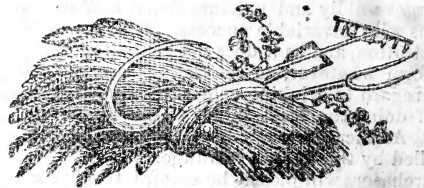
Several bull and heifer Calves, of unquestionable purity of blood, for sale, deliverable at Tolarsville, on the Va. Central Rail Road. Terms reasonable. Address Dr. P. B. PENDLETON, Tolarsville, Louisa county, Va. Apr 56—tf

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RICHMOND, APRIL, 1856.

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